

RECLAMATION

Managing Water in the West

Sunrise Tap Transmission Line Project

Draft Environmental Assessment



**U.S. Department of the Interior
Bureau of Reclamation
Lower Colorado Region
Boulder City, NV**



**U.S. Department of the Interior
Bureau of Land Management
Las Vegas Field Office
Las Vegas, NV**

August 13, 2008



IN REPLY REFER TO:

United States Department of the Interior

BUREAU OF RECLAMATION

Lower Colorado Regional Office

P.O. Box 61470

Boulder City, NV 89006-1470



AUG 08 2008

Dear Interested Parties:

Enclosed for your review and comment is the Bureau of Reclamation, Lower Colorado Region's Draft Environmental Assessment (EA) for the Sunrise Tap Transmission Line Project. This document analyzes the potential impacts associated with the installation and use of the Sunrise Tap Transmission Line.

Copies of the Draft EA are available at the following libraries:

- Clark County Library, Las Vegas, Nevada
- Green Valley Library, Henderson, Nevada
- James I. Gibson Library, Henderson, Nevada
- Las Vegas Public Library, Las Vegas, Nevada
- Sahara West Library, Las Vegas, Nevada
- Sunrise Public Library, Las Vegas, Nevada
- University of Nevada Las Vegas James R. Dickinson Library
- College of Southern Nevada Library, All Campuses
- Whitney Library, Las Vegas, Nevada
- Pitman Library, Henderson, Nevada

The Draft EA is also available electronically at the Bureau of Reclamation Lower Colorado Region website at www.usbr.gov/lc/region/g2000/envdocs.html and at the Bureau of Land Management Las Vegas Field Office website at www.nv.blm.gov/vegas.

Individual respondents may request confidentiality. If you wish to withhold your name or street address from public review or from disclosure under the Freedom of Information Act, you must state this prominently at the beginning of your written comment. Such requests will be honored to the extent allowed by law. All submissions from organizations and businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses, will be available for public inspection in their entirety.

Comments concerning the Draft EA for the Sunrise Tap Transmission Line Project will be accepted through September 29, 2008. Please submit your comments to Mr. Marc Maynard, Natural Resource Specialist, LC-2621, Bureau of Reclamation, P.O. Box 61470, Boulder City, Nevada, 89006. For more information regarding this action, please contact Mr. Maynard at 702-293-8344.

Sincerely,

William J. Liebhauser, Director
Resources Management Office

Enclosure

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APPENDICES

Appendix A – Visual Contrast Rating Worksheets

Appendix B – Scoping Letter

ACRONYMS

ACEC	Area of Critical Environmental Concern
ACSR	Aluminum Conductor Steel Reinforced
APE	Area of Potential Effect
AQMM	Air Quality Mitigation Measure
ASTM	American Society for Testing and Materials
AWT	(Clark County Water Reclamation District) Advanced Wastewater Treatment
BGEPA	Bald and Golden Eagle Protection Act
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
BWQP	Bureau of Water Quality Planning
CAA	Clean Air Act
CBER	Center for Business and Economic Research
CCCP	Clark County Department of Comprehensive Planning
CCSD	Clark County School District
CEQ	Council on Environmental Quality
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information Systems
CFR	Code of Federal Regulations
CP	(Clark County Water Reclamation District) Central Plant
CR	Cultural Resources
CWC	Clean Water Coalition
DAQEM	Department of Air Quality and Environmental Management
DCNR	Department of Conservation and Natural Resources
DEM	Digital Elevation Model
DNWR	Desert National Wildlife Refuge
DOI	U.S. Department of Interiors
EA	Environmental Assessment

ECS	Erosion Control Structure
EMF	Electric and Magnetic Fields
ESA	Endangered Species Act
EVAMP	East Valley Area Master Plan
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act
GIS	Geographical Information System
GPS	Geographic Positioning System
GSMM	Geology and Soils Mitigation Measure
HAM	Harry Allen-Mead
HRC	Harry Reid Center
HSMM	Health, Safety Mitigation Measure
INRMP	Integrated Natural Resources Management Plan
IPP	Independent power Producer
ISA	Instant Study Area
KOP	Key Observation Point
LIMA	Less Intensively Managed Area
LMM	Land Mitigation Measure
LMNRA	Lake Mead National Recreation Area
LUST	Leaking Underground Storage Tank
LVWCC	Las Vegas Wash Coordination Committee
M-D	Designed Manufacturing District
MBTA	Migratory Bird Treaty Act
MLWA	Military Lands Withdrawal Act
MSA	Metropolitan Statistical Area
MSHCP	Multiple Species Habitat Conservation Plan
msl	mean sea level

MOA	Military Operations Area
MOU	Memorandum of Understanding
NAFR	Nellis Air Force Base
NAAQS	National Ambient Air Quality Standards
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWP	Nevada Division of Water Planning
NEPA	National Environmental Policy Act
NESC	National Electric Safety Code
NMM	Noise Mitigation Measure
NNHP	Nevada Natural Heritage Program
NPDES	National Pollutant Discharge Elimination System
NPC	Nevada Power Corporation
NPL	National Priority List
NPS	National Park Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statutes
OHV	Off-Highway Vehicle
PA	Programmatic Agreement
PFYC	Potential Fossil Yield Classification
POD	Plan of Development
PRMM	Paleontological Resources Mitigation Measure
PUCN	Public Utility Commission of Nevada
RECs	Recognized Environmental Conditions
RMM	Recreation Mitigation Resources
RMP	Resource Management Plan
SCOP	Systems Conveyance and Operations Program

SMA	Sunrise Management Area
SNPLMA	Southern Nevada Public Lands Management Act
SNRPC	Southern Nevada Regional Planning Coalition
SNWA	Southern Nevada Water Authority
SPCC	Spill Prevention Control and Countermeasures
SRMA	(Sunrise Mountain) Special Recreation Management Area
SWPPP	Storm Water Pollution Prevention Plan
TMDLs	Total Maximum Daily Loads
TMM	Transportation Mitigation Measure
TSS	Total Suspended Solids
UEPA	Utility Environmental Protection Act
UNLV	University of Las Vegas
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VMM	Vegetation Mitigation Measure
VRM	Visual Resource Management
VRMM	Visual Resources Mitigation Measure
WECC	Western Electrical Coordinating Council
WMM	Wildlife Mitigation Measure
WPCF	Water Pollution Control Facility
WRMM	Water Resources Mitigation Measure
WRF	Water Reclamation Facility
WSA	Wilderness Study Area
ZOI	Zone of Influence

CHAPTER 1 PURPOSE AND NEED

1.1 INTRODUCTION

The Nevada Power Company (NPC) provides electrical service to approximately 786,000 industrial, residential and commercial customers within a 4,500 square mile service territory in southern Nevada. The majority of these customers are located within the greater Las Vegas valley, which represents the NPC core service area. The demand for electrical energy (“load”) is concentrated in this core service area. The Las Vegas valley has experienced tremendous population growth and commercial development over the past decade. Subsequently, this growth has resulted in a corresponding increase in demand for electrical power within the core service area, and has required NPC to complete numerous improvements and upgrades to its electrical transmission system to support the increased demand. NPC forecasts of future demand and associated power flow studies indicate that new bulk transmission infrastructure is necessary 1) to increase system capacity in order to meet current and anticipated future electrical demand and 2) to maintain system reliability for the entire core service area. The Sunrise Tap Transmission Line Project (Figure 1.1-1) is being proposed by NPC in order to meet anticipated future electrical demand and maintain system reliability.

This Environmental Assessment (EA) analyzes the environmental impacts that would result from the Proposed Action and alternatives including the preferred alternative. This Proposed Action is in conformance with the BLM Las Vegas Resource Management Plan (RMP) Environmental Impact Statement (EIS), approved on October 5, 1998. The plan has been reviewed and it is determined the Proposed Action conforms with land use plan decision RW-1, RW-1-e, RW-1-h under the authority of Section 28 of the Mineral Leasing Act of 1920, as amended (30 U.S.C. 185) and the Federal Land Policy and Management Act of October 21, 1976 (FLPMA), as amended (43 U.S.C. 1761 et seq.). This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.) and the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations (CFR) 1500 through 1508) for implementing NEPA.

1.2 PROJECT PURPOSE AND NEED

The greater Las Vegas Valley is one of the fastest growing areas in the United States. Over the past decade, the population of the greater Las Vegas Valley has grown at an average rate of 5.69 percent per year. This compares with average annual growth rates of 4.16 percent and 1.76 percent for Clark County, Nevada, and the United States, respectively. In addition to a rapidly growing population, the greater Las Vegas Valley has also experienced significant commercial growth, including the expansion of casinos and construction of new condominiums and hotels. Although the Center for Business and Economic Research (CBER) predicts modest growth for 2008, the area’s economic vitality should continue to stay above the national average. The latest CBRE predictions include 2.9 percent growth in 2008 visitor volume, 2.6 percent population growth, 2.1 percent employment growth, and 1.6 percent gaming revenue growth. The CBRE also predicts increases in all these percentages in 2009, driven by \$30 billion in Strip investment and a 15.8 percent increase in hotel rooms (CBRE 2007). The population growth and associated residential and commercial development have resulted in a significant increase in demand for electricity. Over the past 10 years, electrical demand within the greater Las Vegas Valley has increased at an annual rate of six percent. In 2006, NPC

experienced a record peak load of 5,623 megawatts (MW) and installed 44,109 new meters. In 2007, NPC experienced a peak load of 5,866 MW.

Demographic and economic projections suggest that population growth and commercial development in the greater Las Vegas valley will continue into the foreseeable future. Each year, the Regional Transportation Commission, the Southern Nevada Water Authority (SNWA), and Clark County Comprehensive Planning collaborate with the CBER to develop a long-term forecast of economic and demographic variables in Clark County. NPC utilizes the CBER economic and demographic projections, as well as climate data, to estimate load growth and identify system improvements necessary to support future electrical demand. Based upon this load forecasting process, NPC estimates that an additional 1,000 MW of electrical supply will be needed to meet demand within the Las Vegas Valley over the next ten years. This represents a 36 percent increase over the current average annual load, and will require substantial improvements to the existing NPC electrical transmission system. Table 1.2-1 presents a summary of the CBER demographic projections and NPC estimates of future load growth.

Figure 1.1-1 Project Area Map
See CD

Table 1.2-1 Demographic and Electrical Data for the Greater Las Vegas Valley

Year	Greater Las Vegas Population ¹	Residential Customers ²	Number of Hotel Rooms ³	Peak Load (MW) ⁴
1996	1,119,708	415,517	92,921	3,332
1997	1,170,113	443,570	103,231	3,469
1998	1,246,193	470,849	106,835	3,855
1999	1,321,319	499,074	116,093	3,976
2000	1,428,690	526,899	122,036	4,325
2001	1,498,274	552,276	125,004	4,412
2002	1,578,332	577,422	126,641	4,617
2003	1,641,529	601,840	128,215	4,808
2004	1,747,025	633,166	129,425	4,969
2005	1,815,700	667,788	132,847	5,563
2006	1,912,654	700,425	132,702	5,623
2007	1,997,290	719,381	132,947	5,866
2008	2,035,769	740,936	141,050	5,959
2009	2,133,439	772,150	160,022	6,199
2010	2,231,535	803,438	172,421	6,435
2011	2,326,897	834,742	175,421	6,652
2012	2,418,946	865,223	179,521	6,840
2013	2,508,107	894,468	181,061	7,009
2014	2,590,520	921,703	182,600	7,196
2015	2,667,377	947,338	184,140	7,382
2016	2,739,305	971,762	185,680	7,558
2017	2,805,884	994,765	187,219	7,729
2018	2,867,963	1,016,544	188,759	7,892
2019	2,926,584	1,037,393	190,298	8,038
2020	2,982,849	1,057,748	191,838	8,170
2021	3,035,340	1,077,314	193,378	8,299
2022	3,085,258	1,096,246	194,917	8,430
2023	3,133,210	1,114,769	196,457	8,567
2024	3,179,443	1,132,907	197,997	8,688
2025	3,224,008	1,150,785	199,536	8,809
2026	3,266,590	1,168,331	201,076	8,930
2027	3,308,134	1,185,822	202,616	9,053
2028	3,348,955	1,203,133	204,155	9,175

¹ 1996-2007 actual data; 2008-2028 estimates based on CBER projections

² 1996-2007 actual data; 2008-2028 estimates from the NPC base case projections included in the 7th Amendment to the NPC 2006 IRP filing

³ 1996-2007 actual data; 2008-2012 estimates based on LVCVA projections; 2013-2028 based on historical growth rates

⁴ 1996-2007 actual data; 2008-2028 estimates from the NPC base case projections included in the 7th Amendment to the NPC 2006 IRP filing

Although population growth rates within the greater Las Vegas Valley have been fairly consistent over the past ten years, the pattern of growth has changed. The valley has traditionally experienced "horizontal" growth, meaning that development has spread out from the downtown/strip area into the surrounding areas. This pattern will continue and NPC estimates 1,000 MW of load growth will be associated with horizontal development over the next ten years. However, a new pattern of growth has recently emerged as a result of increasing land values, a decrease in developable land and greater demand for land within developed portions of the southeastern Las Vegas Valley, including the Las Vegas strip corridor. This new pattern of "vertical" growth is largely the result of urban infill and the replacement of older, existing facilities with high-density developments (i.e., casino expansion, new high-rise condominiums, etc.). Vertical growth has resulted in significant load increases within developed portions of the southeast Las Vegas Valley. This pattern is expected to continue, and NPC estimates that approximately 1,000 MW of load growth will be associated with vertical development over the next ten years.

Supporting increased electrical load associated with vertical growth is a challenge for NPC. The existing NPC infrastructure in the southeastern Las Vegas Valley has limited capacity, and many of the transmission lines and substations would not be able to support anticipated future load growth. Vertical growth is occurring in urbanized areas. The absence of vacant lands in these areas severely constrains NPC's ability to construct new infrastructure (transmission lines and substations) necessary to support load growth. In light of the challenges posed by urban infill and vertical growth, the NPC planning staff has analyzed a variety of system improvements that would allow NPC to support future load growth in the southeastern Las Vegas Valley.

1.2.1 Policy Directives

NPC is regulated by the Public Utility Commission of Nevada (PUCN). PUCN regulations require that NPC provide universal access to affordable, efficient, safe, and reliable electrical service to all customers within its service territory. PUCN also requires that NPC prepare and submit an Integrated Resource Plan that identifies the planning studies and system improvements that will be necessary for NPC to maintain adequate, reliable electrical service to its customers.

NPC must manage its electrical system in compliance with several other regulatory authorities. NPC currently operates 1,665 miles of transmission lines that are under the jurisdiction of the Federal Energy Regulatory Commission. NPC is a wholly-owned subsidiary of Sierra Pacific Resources, and transmission services are offered under the Sierra Pacific Resources Operating Companies' Open Access Transmission Tariff. NPC is also a member of the Western Electrical Coordinating Council (WECC), which is responsible for the reliability of the electrical transmission grid throughout the western United States. As a member of the WECC, NPC operates its electrical system in accordance with WECC reliability standards. These standards include the requirement that the NPC transmission system be able to support a contingency condition (e.g., the loss of a major transmission line or transformer) without causing a major power outage or instability in the WECC grid. Therefore, NPC power flow studies must include analyses of contingency conditions, and improvements/additions to the NPC electrical system must be designed to withstand these contingencies.

1.2.2 Planning Studies

The NPC planning staff has conducted detailed studies of the transmission system utilizing WECC reliability criteria including contingency conditions. These studies identify the generation needs and transmission system improvements necessary to support future load growth while maintaining system reliability. The system studies include power flow models, which are completed annually to include updated load projections and revised transmission configurations that result from new construction.

Capacity limitations of the NPC transmission system have historically restricted the transmission of large quantities of electricity (“bulk transmission”) from generation sources located northeast of Las Vegas into the eastern Las Vegas Valley. NPC constructed the Harry Allen–Mead 500kV transmission line (“HAM”) between the Harry Allen substation and the Mead substation in 2006 largely to create a pathway for bulk transmission. NPC conducted power flow studies on the electrical transmission system (including the HAM line) to 1) evaluate single contingency outage conditions in accordance with WECC standards, 2) identify efficient locations for the injection of bulk transmission into the southeast Las Vegas Valley, and 3) determine the sequence and timing of new facility construction.

NPC power flow studies have identified a number of system improvements that are necessary to maintain system reliability while supporting anticipated load growth in the eastern Las Vegas valley. These improvements are the result of two factors. First, NPC load forecasts have identified the need for approximately 1,000 MW of additional electrical capacity by 2010 to support anticipated load growth in the southeast Las Vegas valley. Second, power flow studies indicate that the primary contingency condition in 2010 is associated with the loss of the HAM line. In the absence of system improvements, the loss of the HAM line would compromise system reliability and could result in unacceptable outage conditions in the Las Vegas Valley.

Currently, the worst single contingency outage condition is associated with the loss of the HAM line. This loss would overload the existing 500/230kV transformer at the Northwest substation and result in unacceptable outage conditions. The addition of a second Northwest 500/230kV transformer is necessary to maintain system integrity and reliability in the loss of the HAM line. NPC power flow studies indicate that the second Northwest 500/230kV transformer has to be in-service by 2010 in order to support load growth and maintain the integrity and reliability of the electrical system.

Following the installation of the second Northwest 500/230kV transformer, the worst contingency outage condition is associated with the loss of the existing Lenzie-Northwest 500kV transmission line. The loss of the Lenzie-Northwest line would result in system overloads and large-scale outages in the southeastern Las Vegas Valley. NPC power flow studies indicate that new bulk injection into the southeast Las Vegas Valley will be necessary to maintain system integrity and reliability during the loss of the Lenzie-Northwest line and support load growth. The new bulk injection needs to be in-service by 2011.

1.2.3 Sunrise Tap Transmission Line Project

NPC power flow studies identified the Sunrise Substation and the Equestrian Substation as the two alternative locations for effective bulk injection of electricity into the southeastern Las Vegas Valley. While both substations would equally resolve system reliability issues, they differ in their ability to efficiently and effectively deliver bulk electricity (increase electrical capacity). NPC studies indicate that the Sunrise Substation represents the best option for new

bulk injection into the southeast Las Vegas Valley for several reasons. First, the Sunrise Substation is approximately eight miles closer to the load center. As a result, routing bulk power through the Sunrise Substation would deliver approximately 900 MW into the southeastern Las Vegas Valley. In contrast, routing bulk power through the Equestrian Substation would only deliver approximately 600 MW. Second, the Sunrise Substation is also significantly closer to and has existing interconnections with the substations that serve the southeastern Las Vegas load center (Clark, Winterwood, and Faulkner). This reduces the new infrastructure the NPC would need to deliver bulk injection into the southeastern Las Vegas Valley.

Based upon the results of the power flow studies, NPC prepared the East Valley Area Master Plan (EVAMP). EVAMP identified numerous improvements to the electrical transmission system that would be necessary for NPC to reliably support future load growth in the eastern Las Vegas Valley. One key component of EVAMP is new bulk injection from the HAM line into the southeastern Las Vegas Valley load center via the Sunrise Substation. EVAMP included engineering analyses and conceptual design of system improvements that would be necessary to move bulk transmission through the Sunrise substation into the southeastern Las Vegas valley. These improvements, which include a new double-circuit 500kV transmission line from the HAM line to a 500/230kV substation at the Sunrise Generation Plant and Substation and related improvements to the existing 230kV and 138kV infrastructure, are collectively referred to as the Sunrise Tap Transmission Line Project.

NPC has concluded that the Sunrise Tap Transmission Line Project is the most efficient alternative for the delivery of bulk transmission into the southeastern Las Vegas Valley. NPC power flow studies indicated that Sunrise Tap Transmission Line Project needs to be in-service by 2011 in order to support future load growth, resolve contingency issues associated with the loss of the Lenzie-Northwest 500kV transmission line, and maintain reliability and integrity of the NPC electrical system. The Sunrise Tap Transmission Line Project was submitted in the 2006 Integrated Resource Plan and received limited approval by the PUCN. The limited approval authorized NPC to spend money on permitting and acquisition of lands rights for the Sunrise Tap Transmission Line Project.

1.3 Authorizations, Permits, and Approvals

The Proposed Action conforms to current related federal, state, and local statutes, regulations, and plans. Table 1.3-1 documents the federal, state, and local agency approvals, reviews, and permitting requirements for the Project.

Table 1.3-1 Authorizations, Permits, and Approvals

Action Requiring Permit	Permit/Approval	Responsible Agency	Statutory Reference
FEDERAL			
Right-of-Way on Bureau of Reclamation lands	Right-of-Way license agreement	Bureau of Reclamation	43 CFR Part 429
Right-of-Way on Bureau of Land Management lands	New and Amended Right-of-Way Grants	Bureau of Land Management	FLPMA 1976 (PL94-579) 43 CFR Part 2800
Grant of Right-of-Way on federal lands	Compliance with the National Environmental Policy Act	Bureau of Reclamation and Bureau of Land Management	40 CFR Part 1500-et.seq.
Grant of Right-of-Way on federal lands	Compliance with Section 106 of the National Historic Preservation Act	Bureau of Reclamation	36 CFR Part 800
Grant of Right-of-Way on federal lands	Compliance with Section 7 of the Endangered Species Act	U.S. Fish and Wildlife Service Bureau of Reclamation	50 CFR Part 402
Construction of transmission line structures \geq 200 feet tall	"No Hazard Declaration"	Federal Aviation Administration	49 U.S.C. 1501 14 CFR Part 77
Grant of Right-of-Way on federal lands	Compliance with Section 404 of the Clean Water Act	U.S. Army Corps of Engineers Bureau of Reclamation	33 U.S.C. 1344
STATE OF NEVADA			
Construction of Utility Facilities	Utility Environmental Protection Act – Permit	Nevada Public Utility Commission	NRS 704.820-704.900 NAC 704.9063, 704.9359
Construction and Operation	Compliance with Section 401 of the Clean Water Act	Nevada Department of Environmental Protection	NRS 445A.010
Construction of Utility Facilities across a State highway	Right-of-Way Permit	Nevada Department of Transportation	NRS 408.423
Removal of Critically Endangered Plants	Take Permit	Nevada Division of Forestry	NRS 527.260-.300

Action Requiring Permit	Permit/Approval	Responsible Agency	Statutory Reference
CLARK COUNTY/CITY OF HENDERSON			
Construction	Grading Permit	Clark County Department of Development Services	Clark County Development Code
Construction and Operation	Conditional Use and Special Use Permits	Clark County Board of Commissioners	Clark County Zoning Ordinance
Construction	Dust Control	Clark County Department of Air Quality and Environmental Management	42 USC 7408, 42 USC 7409
Construction	Compliance Review	Clark County Regional Flood Control District	Clark County Zoning Ordinance
Construction	Grading Permit	City of Henderson	City of Henderson Development Code
Construction	Conditional Use Permit	City of Henderson	City of Henderson Zoning Ordinance

CHAPTER 2 PROJECT ALTERNATIVES

2.1 INTRODUCTION

This chapter presents a detailed description of the alternatives development process for the Sunrise Tap Transmission Line Project, identifies the alternatives that were eliminated from further consideration, and describes the alternatives that are being evaluated in this EA. The alternatives that are analyzed in this EA were developed over several years and were based upon engineering analyses and consultation with stakeholder agencies and local jurisdictions.

An initial step in the alternatives development process was the preparation of the EVAMP. The EVAMP identified a new 500kV transmission line from the HAM line to the Sunrise Substation and associated system improvements, which was referred to as the Sunrise Tap Transmission Line Project. In the course of preparing this study, NPC met with various federal, state, and local agencies, including the Bureau of Reclamation (Reclamation), Bureau of Land Management (BLM), Southern Nevada Water Authority (SNWA), Clark County (Comprehensive Planning, School District, Flood Control District, and Public Works), the City of Henderson, and Lake Las Vegas Resort. Based upon the results of the agency consultations and the feasibility analyses, the EVAMP identified six preliminary route alternatives for the proposed 500kV transmission line, which were designated as A, A1, B, B1, C, and D (Figure 2.1-1).

The final step in the alternatives development process was a series of three facilitated meetings with the primary stakeholder agencies. The ultimate goals of these meetings were to provide a forum for stakeholders to 1) identify and discuss concerns/issues and 2) develop route alternatives that could be carried into the NEPA process for further evaluation. Table 2.1-1 identifies the agencies and personnel that attended these meetings. During the course of these meetings, the stakeholder agencies developed two additional route alternatives E and F (Figure 2.1-1). The agencies mutually agreed to eliminate four route alternatives (A, A1, B1 and C) due to the potential for adverse environmental consequences, and agreed that route alternatives B, D, E, and F should be analyzed through the NEPA process (Figure 2.1-2).

Table 2.1-1 Facilitated Meeting Attendees

Agency	Personnel
Bureau of Reclamation - Lower Colorado Region	John Jamrog, Dave Curtis, Richard Murphy, Laureen Perry
Bureau of Land Management – Las Vegas Field Office	Jeff Steinmetz, Michael Johnson, Susanne Rowe, Scott Sanderford, Gayle Marrs-Smith, Lucas Lucero, Shonna Dooman, Mark Slaughter, Sharon DiPinto, Carrie Ronning
City of Henderson	Bob Murnane, John Rinaldi, Tracy Foutz, Shelley La Bay
Clark County Comprehensive Planning	Walter Cairns
Clark County School District	Guy Corrado
Clark County Flood Control District	Kevin Eubanks
Clark County Water Reclamation District	Richard Montague
Clark County Public Works	Ken Lambert
Clark County Parks and Recreation	Kathleen Blakely, Bruce Sillitoe
Nevada Power Company	Art Davoren, Stan Rolf, Dave Rigdon, Lisa Corbett, Joanna Brooks
POWER Engineers	Lynn Askew, Terry Enk, Mark Schaffer, Laurie Kaufman

Figure 2.1-1 Route Alternatives
See CD

Figure 2.1-2 Route Alternatives Advanced by Stakeholder Agencies
See CD

2.2 ALTERNATIVES BEING CONSIDERED

The project alternatives include the No Action alternative and the Proposed Action. The Proposed Action involves construction of a new double-circuit 500kV transmission line and associated improvements to the NPC electrical distribution system. Four alternatives (Alternatives 1, 2, 3, and 4) for the Proposed Action are evaluated in this EA. Alternative 4 is the preferred alternative. These alternatives are very similar, and only differ in the route alignment of the new double-circuit 500kV transmission line between the HAM line and the Sunrise Substation. The proposed 230kV transmission line upgrades and substation improvements are identical among all four action alternatives.

However, the No Action alternative would not allow NPC to fulfill its mandates. NPC is regulated by the PUCN. PUCN regulations mandate that NPC “provide universal access to affordable, efficient, safe, and reliable electrical service to all customers within its service territory.” NPC is also a member of the WECC and operates its electrical system in accordance with WECC reliability standards. These standards require that the NPC transmission system be able to support a contingency condition such as the loss of a major transmission line or transformer. NPC load projections and power flow studies indicate that the Sunrise Tap Transmission Line Project is necessary for NPC to 1) meet anticipated load growth in the southeast Las Vegas Valley and 2) support future contingency conditions. The inability to support contingency conditions would place the entire valley at risk of large scale outages in the future. The No Action alternative would preclude NPC from meeting its mandates under PUCN and WECC and would inhibit the ability of NPC to provide adequate and reliable electrical service to current and future customers in the southeast Las Vegas Valley.

2.2.1 No Action

Evaluation of the No Action alternative is a requirement of NEPA and the associated implementing regulations (40 CFR 1500-1508). The No Action alternative is defined as not constructing the Sunrise Tap Transmission Line Project (the double-circuit 500kV transmission line and associated system improvements). The No Action alternative would eliminate the environmental impacts associated with construction, operation, and maintenance of the Sunrise Tap Transmission Line Project. It would also eliminate the financial investment required by NPC to complete the project.

2.2.2 Proposed Action

The Proposed Action involves the construction, operation, and maintenance of the Sunrise Tap Transmission Line Project. The Sunrise Tap Transmission Line Project has several components including 1) construction of a new double-circuit 500kV transmission line between the HAM line and the Sunrise Substation, 2) upgrading the existing Las Vegas #3 (LV#3) 69kV transmission line to quad-circuit 230kV/lower voltage, 3) constructing a new quad-circuit 230kV/lower voltage transmission line from the existing LV#3 to the Equestrian Substation, 4) upgrading the existing Las Vegas #1 (LV#1) 69kV transmission line to quad-circuit 230kV/lower voltage between the Sunrise Substation to the Clark Substation, 5) upgrading the existing transmission lines between the Sunrise Substation and the Winterwood Substation to double circuit 138kV and quad-circuit 138/69kV, and 6) upgrading four existing NPC substations (Sunrise, Winterwood, Clark, and Equestrian) to support the new 500kV and 230kV transmission lines. Figure 2.2-1 presents the Proposed Action and alternatives.

The Proposed Action includes tapping the Harry Allen-Mead 500kV transmission line in the vicinity of Lake Las Vegas and constructing approximately seven miles of new double-circuit

500kV transmission line from the tap point to the Sunrise Generating Plant and Substation. This new 500kV transmission line would cross lands administered by Reclamation and BLM as well as private lands. In order to meet anticipated demand and maintain system reliability, the in-service date for the Proposed Action is June 2011. It is anticipated that the proposed 500kV transmission line and associated improvements would take approximately 24 months to construct.

Alternative 1

Alternative 1 corresponds to Route E in Figure 2.1-2 and is shown in Figure 2.2-1 with other project components. The Alternative 1 alignment begins at a tap point on the HAM line located approximately 1.2 miles north of the Las Vegas Wash near Lake Las Vegas. From the tap point, the route runs southwest across the Rainbow Gardens Area of Critical Environmental Concern (ACEC) lands managed by the BLM for approximately 1.42 miles to the intersection with Lava Butte Road. It then parallels Lava Butte Road to the southwest, crossing 0.85 miles of the Rainbow Gardens ACEC lands managed by the BLM and 0.24 miles of Reclamation land to a point approximately 300 feet north of the SNWA water pipeline road. It then runs west parallel to and approximately 300 feet north of the SNWA water pipeline road crossing approximately 0.33 miles of Reclamation land. It then runs northwest crossing approximately 2.0 miles of Reclamation land, 0.95 miles of private land and 0.1 miles of land managed by the BLM (outside the ACEC) to the intersection of Hollywood Boulevard. The final portion of the route, common to all 4 alternatives, runs north and parallel to the east side of Hollywood Boulevard across land managed by the BLM (outside the ACEC) for approximately 0.72 miles, then turns west parallel to the north side of Desert Inn Road across private land for approximately 0.27 miles to a point adjacent to the Las Vegas Wash, then runs northwest parallel to and east of the Las Vegas Wash across City of Las Vegas land for approximately 0.54 miles, then crossing Vegas Valley Road and into the Sunrise Substation. This route alignment is approximately 7.42 miles long, crossing approximately 2.57 miles of Reclamation land, 3.09 miles of BLM land, 0.54 miles of City of Las Vegas land, and 1.22 miles of private land.

Alternative 2

Alternative 2 corresponds to Route B in Figure 2.1-2 and is shown in Figure 2.2-1 with other project components. The Alternative 2 alignment begins at a tap point on the HAM line located approximately 0.13 miles north of the Las Vegas Wash near Lake Las Vegas. From the tap point, the route runs southwest across approximately 0.2 miles of private lands, continuing across the Rainbow Gardens ACEC lands managed by the BLM for approximately 0.8 miles to a point along the northern boundary of Reclamation lands located approximately 1,000 feet north of the SNWA water pipeline road. It then runs west across Reclamation lands for approximately 1.7 miles parallel to and approximately 1,000 feet north of the SNWA water pipeline road. It then runs northwest across approximately 2.1 miles of Reclamation lands, approximately 0.3 miles of the Rainbow Gardens ACEC lands managed by the BLM, and 0.15 miles of private land. The route then runs west across approximately 0.4 miles of land managed by the BLM (outside the ACEC) to the intersection of Hollywood Boulevard. From this point to the Sunrise Substation, Alternative 2 alignment utilizes the same alignment as the other alternatives. This route alignment is approximately 7.18 miles long, crossing approximately 3.8 miles of Reclamation land, 2.22 miles of BLM land, 0.54 miles of City of Las Vegas land, and 0.62 miles of private land.

Alternative 3

Alternative 3 corresponds to Route F in Figure 2.1-2 and is shown in Figure 2.2-1 with other project components. The Alternative 3 alignment begins at a tap point on the HAM line located approximately 0.13 miles north of the Las Vegas Wash near Lake Las Vegas. From the tap point,

the route runs southwest across approximately 0.2 miles of private lands continuing across the Rainbow Gardens ACEC lands managed by the BLM for approximately 0.8 miles to a point along the northern boundary of Reclamation lands located approximately 1,000 feet north of the SNWA water pipeline road. It then runs west across approximately 2.0 miles of Reclamation lands to a point located approximately 300 feet north of the SNWA water pipeline road. It then runs northwest across approximately 1.6 miles of Reclamation lands, 0.95 miles of private lands, and 0.1 miles of BLM lands (outside the Rainbow Gardens ACEC). From this point to the Sunrise Substation, Alternative 3 alignment utilizes the same alignment as the other alternatives. This route alignment is approximately 7.18 miles long, crossing approximately 3.6 miles of Reclamation land, 0.54 miles of City of Las Vegas land, 1.62 miles of BLM land, and 1.42 miles of private land.

Alternative 4 (Preferred Alternative)

Alternative 4 corresponds to Route D in Figure 2.1-2 and is shown in Figure 2.2-1 with other project components. The Alternative 4 alignment begins at a tap point on the HAM line located approximately 0.13 miles north of the Las Vegas Wash near Lake Las Vegas. From the tap point, the route runs southwest across approximately 0.2 miles of private lands, continuing across the Rainbow Gardens ACEC lands managed by the BLM for approximately 0.8 miles to a point along the northern boundary of Reclamation lands, and then across approximately 0.28 miles of Reclamation lands to a point located approximately 300 feet north of the SNWA water pipeline road. It then runs west across approximately 1.5 miles of Reclamation land. It then runs northwest parallel to and approximately 300 feet north of the SNWA water pipeline road crossing approximately 2.0 miles of Reclamation land, 0.1 miles of land managed by the BLM (outside the ACEC), and 0.95 miles of private land, to the intersection with Hollywood Boulevard. From this point to the Sunrise Substation, Alternative 4 alignment utilizes the same alignment as the other alternatives. This route is approximately 7.36 miles long, crossing approximately 3.78 miles of Reclamation land, 0.54 miles of City of Las Vegas land, 1.62 miles of BLM land, and 1.42 miles of private land.

Figure 2.2-1 Project Components
See CD

2.3 ALTERNATIVES CONSIDERED AND ELIMINATED

2.3.1 Alternative Technologies

NPC evaluated the use of 230kV technology for bulk transmission into the Sunrise Substation. This alternative would require the construction of eight 230kV transmission lines in order to deliver the same amount of energy as the double-circuit 500kV transmission line. It would also require a new 500kV/230kV substation adjacent to the HAM corridor and a substantial expansion of the Sunrise Substation. Several factors resulted in the elimination of this alternative from further consideration. First, this alternative would dramatically increase the total project costs. Second, the construction of eight 230kV transmission lines would likely result in greater impacts to sensitive environmental resources, including the Rainbow Gardens ACEC, Clark County Wetlands Park, and residential areas, compared to a double-circuit 500kV transmission line. Third, the substation infrastructure necessary to support eight 230kV transmission lines could not be designed to fit within the existing Sunrise Substation site, necessitating the need for new substations within the southeastern Las Vegas Valley. Fourth, the 230kV alternative may not resolve contingency issues in the NPC transmission system.

NPC also investigated the installation of underground 500kV cables. The design, manufacture, installation, operation, and maintenance of long 500kV underground transmission cable systems are experimental in the United States. Installation of underground trenches and/or tunnels and 500kV cable would result in major initial ground disturbances compared to overhead construction. Additionally, reliability issues for long-term operation remain unresolved. Repairing a failed underground cable can take up to several weeks due to the complexity of specialized cable as well as the equipment and personnel required. Additional voltage control infrastructure would be necessary. An underground system would present significantly higher cost, reliability, and maintenance concerns. For these reasons, it was determined that an underground 500kV cable system is not feasible and it was eliminated from further consideration.

2.3.2 Alternative Route Alignments

Several route alternatives for the new double-circuit 500kV transmission line that were developed during the EVAMP study were thoroughly discussed and evaluated at the facilitated meetings. Four of these routes were ultimately eliminated from further consideration by the stakeholder agencies (Figure 2.2-1).

Alternative A

Alternative A begins at a tap point located approximately 500 feet north of the Las Vegas Wash near Lake Las Vegas. It runs southwest through the Rainbow Gardens ACEC to a point along the northern boundary of the Wetlands Park. The route then runs northwest through the Rainbow Gardens ACEC to Vegas Valley Drive and follows Vegas Valley Drive to the west into the Sunrise Substation. The stakeholder agencies identified several concerns with the Alternative A route alignment. The primary reasons for eliminating this alternative from consideration included:

- Creation of new access roads through the Rainbow Gardens ACEC.
- Facilitating increased illegal ORV use in the Rainbow Gardens ACEC.
- Impacts to sensitive plants and wildlife in the Rainbow Gardens ACEC.
- Impacts to the Clark County School District site on the southeast corner of Vegas Valley Drive and Hollywood Boulevard.

- Impacts to new residential and commercial development at the intersection Vegas Valley Drive and Hollywood Boulevard.

Alternative A1

Alternative A1 begins at a tap point located approximately 500 feet north of the Las Vegas Wash near Lake Las Vegas and runs southwest through the Rainbow Gardens ACEC to a point along the northern boundary of Reclamation lands. The route then runs northwest through the Rainbow Gardens ACEC to Vegas Valley Drive on an alignment slightly south of Alternative A. The route then follows Vegas Valley Drive to the west into the Sunrise Substation. The stakeholder agencies identified several concerns with Alternative A1. The primary reasons for eliminating this alternative from consideration were the same as those identified for Alternative A and included:

- Creation of new access roads through the Rainbow Gardens ACEC.
- Facilitating increased illegal ORV use in the Rainbow Gardens ACEC.
- Impacts to sensitive plants and wildlife in the Rainbow Gardens ACEC.
- Impacts to the Clark County School District site on the southeast corner of Vegas Valley Drive and Hollywood Boulevard.
- Impacts to new residential and commercial development at the intersection Vegas Valley Drive and Hollywood Boulevard.

Alternative B1

Alternative B1 starts at a tap point located approximately 500 feet north of the Las Vegas Wash near Lake Las Vegas, crosses southwest through the Rainbow Gardens ACEC for a short distance and then enters Reclamation lands. It then runs due west along Reclamation lands approximately 1,000 feet north of and parallel to the SNWA water pipeline. It continues west across the pipelines and crosses through the Wetlands Park until reaching the LV#3 transmission line corridor. From this point, the route heads northwest paralleling the LV#3 transmission line corridor, exits the Wetlands Park, and runs north along Hollywood Boulevard to the intersection with Vegas Valley Drive. The route then follows Vegas Valley Drive to the west into the Sunrise Substation. The stakeholder agencies identified several issues and concerns with Alternative B1. The primary reasons for eliminating this alternative from consideration included:

- Impacts to sensitive resources in the Rainbow Gardens ACEC.
- Potential impacts to sensitive resources in the Clark County Wetlands Park.
- Potential impacts to the Las Vegas Wash Archaeological District.
- Proximity to the planned Sunrise Trailhead and recreational trails in the Clark County Wetlands Park.
- Proximity to water treatment facility.
- Crossings of the Las Vegas Wash and Flamingo Wash.
- Impacts to the Clark County School District site on the southeast corner of Vegas Valley Road and Hollywood Boulevard.
- Impacts to new residential and commercial development at the intersection Vegas Valley Drive and Hollywood Boulevard.

Alternative C

Alternative C starts at a tap point located approximately one mile south of the Las Vegas Wash adjacent to the Falls Golf Resort. The route heads west through Reclamation lands, the Henderson landfill, and the Tuscany and Weston Hills residential developments. The route angles to the northwest adjacent to the Silver Bowl, enters the Wetlands Park, and heads north through the Wetlands Park and along the eastern side of Hollywood Boulevard to the intersection with Vegas Valley Drive. The route then follows Vegas Valley Drive to the west into the Sunrise Substation. The stakeholder agencies identified several issues and concerns with Alternative C. The primary reasons for eliminating this alternative from consideration included:

- Issues associated with the Henderson landfill.
- Potential impacts to a site of a future school for the Clark County School District.
- Proximity to the Tuscany and Weston Hills residential developments.
- Potential impacts to sensitive resources in the Clark County Wetlands Park.
- Potential impacts to the proposed Clark County Wetlands Park visitor center.
- Potential impacts to the Las Vegas Wash Archaeological District.
- Crossings of the Las Vegas Wash and Flamingo Wash.
- Impacts to the Clark County School District site on the southeast corner of Vegas Valley Road and Hollywood Boulevard.
- Impacts to new residential and commercial development at the intersection Vegas Valley Drive and Hollywood Boulevard.
- Impacts to private landowners.

2.4 PROJECT DETAILS

2.4.1 Project Components

500kV Transmission Line

A new double-circuit 500kV transmission line would be constructed from the HAM 500kV transmission line to a new 500kV yard within the existing Sunrise Substation (Figure 2.2-1). The proposed 500kV transmission line would utilize both lattice and single pole structures. Lattice towers are proposed for the portion of the transmission line between the HAM line and the northernmost structure along Hollywood Boulevard. These self-supporting, galvanized steel lattice structures would be approximately 150-200 feet tall and have four legs spaced approximately 100 feet apart. The typical span between structures would be approximately 900 feet. An illustration of the lattice tower structure, including the double-circuit configuration, is presented in Figure 2.4-1. Tubular steel pole structures would be utilized between Hollywood Boulevard and the Sunrise Substation. These self-supporting, galvanized steel poles would be approximately 150-200 feet tall and would be approximately 8 feet in diameter at the base. The typical span between structures would be approximately 900 feet. An illustration of the single pole structure, including the double-circuit configuration, is presented in Figure 2.4-2.

The conductors on both the lattice and single pole structures would consist of three-1590 kcmil Aluminum Conductor Steel Reinforced (ACSR) per phase. In accordance with National Electrical Safety Code (NESC) and NPC standards, the 500kV transmission line would be designed to ensure that conductors are a minimum of 31 feet above the ground (at 212° F). Therefore, the exact height of each structure will be determined by local topography and conductor clearance

requirements. Tangent structures would have six vertical “I” insulator strings suspended from the structure. Deadend structures would have six horizontal strings installed in tension with the conductor on each side of the structure. Two overhead ground wires would be installed on the top of each structure to protect the transmission line from direct lightning strikes.

The lattice tower legs and single pole structures would be placed on individual foundations. The foundation for the lattice towers would include four cast-in-place concrete footings. Each footing would be approximately 4 feet in diameter and 15 feet deep. Steel pole structures would be installed on cast-in-place concrete foundations. These foundations would be approximately 9 feet in diameter and 20 feet deep. The actual foundation design will depend upon specific geological conditions at each structure location. Design specifications for the 500kV transmission line are summarized in Table 2.4-1.

New rights-of-way and easements would be required for the transmission line and associated access roads (Table 2.4-1). NPC standards require a 200-foot-wide right-of-way for a double-circuit 500kV transmission line. The 500kV transmission line route would require rights-of-way to be obtained from Reclamation and/or the BLM. Perpetual easements from two private landowners would be obtained for the portion of the transmission line on non-federal lands between Hollywood Boulevard and the Sunrise Substation. Every effort would be made to purchase all the land rights on private lands through reasonable negotiations with the current owners. An easement would also be obtained from the City of Las Vegas for that portion of the transmission line that crosses the City of Las Vegas Wastewater Treatment Facility property located adjacent to the Flamingo Wash near the Sunrise Substation.

Table 2.4-1 Design Specifications for the 500kV Transmission Line

Feature	Description
Line Length	Approximately 7 miles
Type of Structure	Galvanized steel lattice tower and single steel pole
Structure Height	Lattice towers: 150-200 feet; Steel poles: 150-200 feet
Average Span Length	900 feet
Number of Structures	Lattice towers: 42; Steel poles: 4
Right-of-Way Width	200 feet
Land Permanently Disturbed (Estimate)	
Structure Base	Lattice towers: 100 x 100 feet Steel poles: 100 x 100 feet
Counterpoise grounding trench (per structure)	175 x 0.5 feet x 2
Land Temporarily Disturbed (Estimate)	
Lattice Structure Work Area	200 x 250 feet
Single Steel Pole Structure Work Area	200 x 200 feet
Wire-Pulling/Tensioning Sites (tangent & angle structures)	200 x 600 feet x 2
Guard Structures	Minimum area needed to construct guard structures adjacent to roads/electrical lines
Access Roads (Estimate)	
New or Upgraded Roads Required	8 to 16 acres depending on alternative selected
Existing Roads	Use existing roads between Hollywood Blvd. and Sunrise Substation and SNWA water pipeline road
Electrical Properties	
Nominal Voltage	525,000 volts AC
Capacity	900 to 6,000 MW
Circuit Configuration	Single circuit with 3 phases per structure, 3 subconductors per phase
Conductor Size	1590 kcmil ACSR
Ground Clearance of Conductor	31 feet minimum at 212°F
Structure Foundations	Drilled piers - cast-in-place concrete
New Rights-of-Way Required (Dependent on Alternative)	
Reclamation	2.6 to 3.8 miles
BLM	1.6 to 3.0 miles
City of Las Vegas	0.54 miles
Private	0.6 to 1.4 miles

Figure 2.4-1 Typical Double Circuit 500kV Lattice Structure
See CD

Figure 2.4-2 Typical Double Circuit 500kV Single Pole Structure
See CD

230kV Transmission Lines – Sunrise-Equestrian (LV#3) and Sunrise-Clark (LV#1)

The Proposed Action includes the construction of two quad-circuit 230kV transmission lines between existing NPC substations. These 230kV quad-circuit transmission lines would include two 230kV conductors above two conductors of lesser voltage (138kV and/or 69kV).

One quad-circuit 230kV transmission line would connect the Sunrise Substation and the Equestrian Substation (Figure 2.2-1). The Proposed Action includes replacing a segment of the existing LV#3 69kV transmission line with a quad-circuit 230kV transmission line (8.6 miles from the Sunrise Substation to the designated utility corridor south of Lake Mead Boulevard). Within this segment, the quad-circuit 230kV transmission line would be constructed within the existing 100-foot wide NPC right-of-way. The LV#3 alignment across the Las Vegas Wash currently follows the existing 69kV alignment that would be re-built in-place. This current alignment may be modified to reduce span length and avoid interference with the Pabco Weir. To accommodate this potential modification, the area of the Las Vegas Wash crossing was considered a 1 mile corridor (1/2 mile each side of centerline) (Figure 2.2-1). The Proposed Action includes transmission line construction of an entirely new quad-circuit 230kV transmission line within the designated utility corridor from the LV#3 transmission line and the Equestrian Substation (2.5 miles). NPC is requesting a new right-of-way from Reclamation for this segment of the proposed transmission line.

A second quad-circuit 230kV transmission line would connect the Sunrise Substation and the Clark Substation (Figure 2.2-1). The Proposed Action includes replacing 4.0 miles of the existing LV#1 69kV transmission line with a quad-circuit 230kV transmission line. This segment of the new transmission line would be located within the existing NPC right-of-way. Two short segments of entirely new line would be constructed for this second quad-circuit 230kV transmission line. These include a 0.3 mile segment adjacent to the Sunrise Substation and a 0.9 mile segment adjacent to the Clark Substation (Figure 2.2-1). NPC would have to acquire new easements from private landowners for these two short segments.

The quad-circuit 230kV transmission lines would be constructed on tubular single pole steel structures (Figure 2.4-3). The structures would be approximately 120 feet tall and 5 feet in diameter at the base, with the exact height of each structure determined by local topography and conductor clearance requirements. The average span between structures would be approximately 450 feet. There would be two-954 kcmil ACSR conductors per phase for the 230kV voltage and one-954 kcmil ACSR conductors per phase for the 138kV and 69kV voltages. These structures would be for the most part direct imbedded 15-20 feet into the ground, with the actual embedment depth determined by local geological conditions. Angle structures would be on larger concrete foundations. The quad-circuit 230kV transmission line specifications are presented in Table 2.4-2.

Table 2.4-2 Design Specifications for the Proposed 230kV Transmission Lines

Feature	Description
Line Length	Approximately 16 miles total; 12.6 rebuild, 3.7 new
Type of Structure	Single steel poles
Structure Height	120 feet
Average Span Length	450 feet
Number of Structures	176
Right-of-Way Width	100 feet for existing NPC right-of-way; 60 feet for new right-of-way
Land Permanently Disturbed (Estimate)	
Structure Base	40 x 40 feet
Counterpoise grounding trench (per structure)	160 x 0.5 feet
Land Temporarily Disturbed (Estimate)	
Structure Work Area	100 x 200 feet
Wire-Pulling/Tensioning Sites (tangent & angle structures)	100 x 400 feet x 2
Guard Structures	Minimum area needed to construct guard structures adjacent to roads/electrical lines
Access Roads (Estimate)	
New or Upgraded Roads Required (Equestrian to Sunrise only)	5.4 acres
Existing Roads	Utilize existing roads for the majority of line
Electrical Properties	
Nominal Voltage	241,000 volts AC
Capacity	231kV to 235kV
Circuit Configuration	Quad, Two 230kV circuits and two circuits which could be either 138kV, 69kV or one of each
Conductor Size	230kV circuits – 2-954 ACSR Cardinal per phase 138kV or 69kV circuits – 1-954 ACSS Cardinal per phase
Ground Clearance of Conductor	23 feet to lower circuit 138 kV
Structure Foundations	Angle structures - Drilled piers with cast-in-place concrete. Tangent structures – Direct embedded poles.
New Rights-of-Way Required	
Private	1.2 miles (LV#1)
Reclamation	2.5 miles (LV#3)

138kV Transmission Lines

The Proposed Action includes the construction of quad-circuit 138kV transmission lines and double-circuit 138kV transmission lines between the Sunrise and Winterwood Substations (Figure 2.4-4). The new 138kV transmission lines would replace existing transmission lines within existing NPC rights-of-way. The 138kV transmission lines would be placed on single steel pole structures. These structures would be slightly taller, 90-105 feet, than the existing transmission line structures, but have similar structure diameters (3 feet) and span length. Structures would generally be direct embedded 15-20 feet into the ground, with the actual embedment depth determined by local geological conditions. Angle structures would require larger concrete foundations.

Figure 2.4-3 Typical Quad-Circuit 230kV Single Pole Structure
See CD

Substations – Sunrise, Winterwood, Clark, and Equestrian

The Proposed Action includes modifications to four existing substations (Sunrise, Winterwood, Clark, and Equestrian) in order to support the proposed double-circuit 500kV, quad-circuit 230/138kV, and quad-circuit 138kV transmission lines (Figure 2.2-1). These four substations are owned by NPC, and all modifications would occur within the existing substation property boundaries. The proposed substation modifications are summarized below.

Sunrise Substation

NPC has completed conceptual design of the modifications for the Sunrise Substation (Figure 2.4-5). The following facilities will be constructed within the substation:

- Two 500kV line terminals;
- One 4 breaker 500kV ring bus;
- Two 1500 MVA 500/230kV autotransformer banks with 8 single phase transformers;
- One 230kV yard with 5-bay breaker and ten 230kV line and transformer terminals;
- Two 230kV high-voltage underground ties;
- One 138kV yard with a 7-bay breaker and one half arrangement;
- One 500/230kV control house enclosure and one 138kV control house enclosure; and
- Two 230/138kV, 300 MVA autotransformer banks.

Winterwood Substation

NPC has completed conceptual design of the modifications for the Winterwood Substation (Figure 2.4-6). This design includes removal of the existing 230/138kV, 300 mega-volt-amperes (MVA) autotransformer, 138kV yard and four 69kV switchrack bays, distribution banks # 3 and # 4, 69kV capacitors, and 12kV distribution bays. The Winterwood Substation upgrades also include rearrangement of the existing 69kV circuits, relocation of the 12kV facilities, and expansion of the 138kV control house. The following new facilities will be constructed within the substation:

- One 138/12kV transformer bank;
- One 240MVA, 138/69kV autotransformer; and
- One 7-bay, 138kV breaker and one half yard.

Clark and Equestrian Substations

NPC has not completed conceptual designs for modifications of the Clark or Equestrian substations. However, these upgrades would involve addition or modification of 230kV transformers and associated facilities. All work would occur within the existing substation site footprint.

2.4.2 Construction Activities

This section briefly describes the construction activities associated with the Proposed Action. The general sequence of transmission line construction includes: surveying and staking the centerline; construction of access roads; right-of-way clearing; installation of foundations; assembling and erecting the structures; installing ground wires and conductors; installing ground rods/counterpoise; and site cleanup and reclamation. Typical transmission line construction activities are depicted in Figure 2.4-7. These activities would be similar for both the 500kV and 230kV transmission lines. A general sequence for substation improvements is not included in this section as substation construction activities are site-specific.

Figure 2.4-4 Winterwood-Sunrise Conceptual Layout
See CD

Figure 2.4-5 Sunrise Substation Conceptual Layout
See CD

Figure 2.4-6 Winterwood Substation Conceptual Layout
See CD

Figure 2.4-7 Winterwood Substation Conceptual Layout
See CD

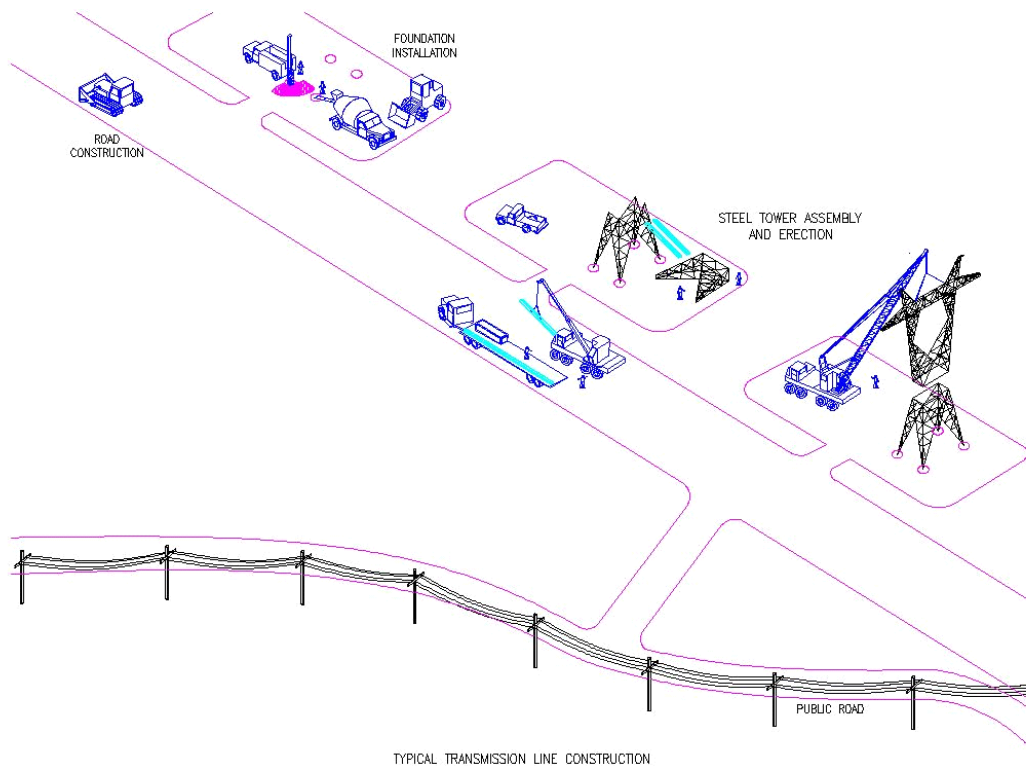


Figure 2.4-8 Typical Transmission Line Construction Activities

Land Surveys

Land surveyors would locate and mark the transmission line centerlines, as well as the locations of individual transmission line structures, right-of-way boundaries, and access road centerlines. These survey activities would be completed prior to the start of construction. Survey and staking of the transmission line and access road centerlines must be completed prior to pre-construction surveys for cultural and biological resources.

Access Road Construction

In order to facilitate construction of the transmission lines, roadways must be established that allow construction vehicles and equipment to access the location of each transmission structure. The Proposed Action has been designed to utilize existing access roads wherever practical in order to minimize environmental impacts associated with the construction of new access roads. The existing Southern Nevada Water Authority (SNWA) pipeline road would be used as primary access for construction of the 500kV transmission line. As necessary, short spur roads off the existing SNWA pipeline road would be constructed to access individual structures. New roads would be located within the right-of-way whenever practical and would be located to minimize potential impacts to environmental and visual resources. The number of new roads would be held to a minimum, consistent with their intended use, such as structure construction or conductor stringing and tensioning. Spur roads would be part of the permanent right-of-way. Where existing access does not exist along the route, new access roads would be constructed. NPC estimates that

approximately one mile of new road would be required for each mile of transmission line in locations where there are no existing roads.

The specific locations and design of all new access and spur roads would be determined during final project design. All roads would be constructed in accordance with Reclamation and BLM standards. New access roads and spur roads would typically include a 20-foot wide travel way and 2-foot berms on each side. The existing road network may also require some minor improvements, including clearing of vegetation, re-grading the road bed, and installing drainage structures. Standard best management practices, such as erosion control measures, would be implemented to reduce potential impacts associated with construction of access roads.

Right-of-Way Clearing

Vegetation within the rights-of-way would be cleared to provide access to the transmission line route as well as to maintain conductor clearance in accordance with NPC and WECC standards. Selective manual clearing would occur only where determined to be necessary. Based upon initial analysis of the Proposed Action, it is anticipated that minor clearing would only be necessary along the 230kV transmission lines. Vegetation within the rights-of-way would not be chemically treated unless required by the permitting agencies.

Footings and Foundations

Power augers and backhoes would be used to excavate materials for structure footings and foundations. A vehicle-mounted power auger or backhoe would be used where soil conditions permit. Suitable spoil materials would be stored and used for fill. In rocky areas, drilling and blasting may be required for excavations of footings and foundations. Where blasting is required, permits would be obtained from regulatory agencies and safeguards such as blasting mats would be utilized. Special rock anchors may be necessary in rocky areas, while soil stabilization measures (i.e., a gelling agent) may be necessary in sandy areas. Cast-in-place footings and foundations would be constructed by pouring concrete around reinforcing steel in the footing/foundation excavation. Open excavations would be fenced or covered to prevent human and wildlife access during construction.

Structure Assembly and Erection

A work area would be established at each transmission line structure to facilitate the operation of construction equipment. Work areas may include a leveled “pad” to ensure the safe operation of construction equipment, including large cranes. Pads are typically 200 feet by 200 feet. The installation of structure footings/foundations and tower assembly would also occur within the work area. For the 500kV transmission line, work areas would be approximately 200 feet by 200 feet for single pole structures and 200 feet by 250 feet for lattice structures. For the 230kV transmission lines, work areas would be approximately 100 feet by 200 feet.

Work areas would be cleared of vegetation as necessary. Generally, small shrubs and herbaceous vegetation would not be cleared from work areas, but would be crushed by construction equipment and materials. After construction activities are completed, all pads not needed for normal transmission line maintenance would be re-graded to original landscape contours.

Structure materials, including lattice and pole sections and associated hardware, would be transported by truck to each structure location. The sections would be assembled within the designated work area into subsections of convenient size and weight. Assembled subsections

would be lifted into place by a large crane and then fastened together to form a complete structure (Figure 2.4-7).

Conductor Installation

Once the structures are erected, the conductor, insulators, hardware, and stringing sheaves would be installed on each structure. During conductor installation, guard structures would be erected over major highways, railroads, power lines, and some roads. Guard structures typically consist of H-frame poles, and are designed to prevent a ground wire or conductor from contacting an object. Guard structures would not likely be required for small roads, where traffic could be controlled with flagmen or barriers. Areas identified for guard structures would be requested as temporary rights-of-way and would be restored after use.

Pilot lines would be pulled between structures and threaded through the stringing sheaves. A large diameter, pulling line would then be attached to the pilot line and strung. The pulling line is attached to the conductor/ground wire and used to pull the conductor/ground wire through the sheave. This process is repeated until the conductor/ground wire is pulled through all sheaves.

The conductor/ground wire is installed under controlled tension using powered pulling equipment at one end and powered braking or tensioning equipment at the other end. The tensioner and puller work in concert to create tension on the conductor/ground wire, thereby maintaining ground clearance and avoiding damage to conductor, ground wire, or any objects beneath them.

Equipment required for tensioning include a tensioner, line trucks, wire trailers, and tractors. Pullers, trucks, and tractors are needed for pulling and for temporarily anchoring the ground wire and conductor at the pulling site (Figure 2.4-8). Tensioning and pulling sites would be established along the line routes. The pulling and tensioning sites would be approximately 200 feet by 600 feet for the 500kV transmission line and 100 feet by 400 feet for the 230kV transmission line. The locations of tensioning and pulling sites would be determined during final project design.

Counterpoise

Counterpoise would be utilized for the 500kV and 230kV transmission lines. Counterpoise consists of a bare copper clad or galvanized steel cable buried at least 12 inches deep. This cable would extend out approximately 200 feet from one or more tower legs, and would be located within the right-of-way. A trench 160 to 175 feet long by 6 inches wide would be required per structure for counterpoise.

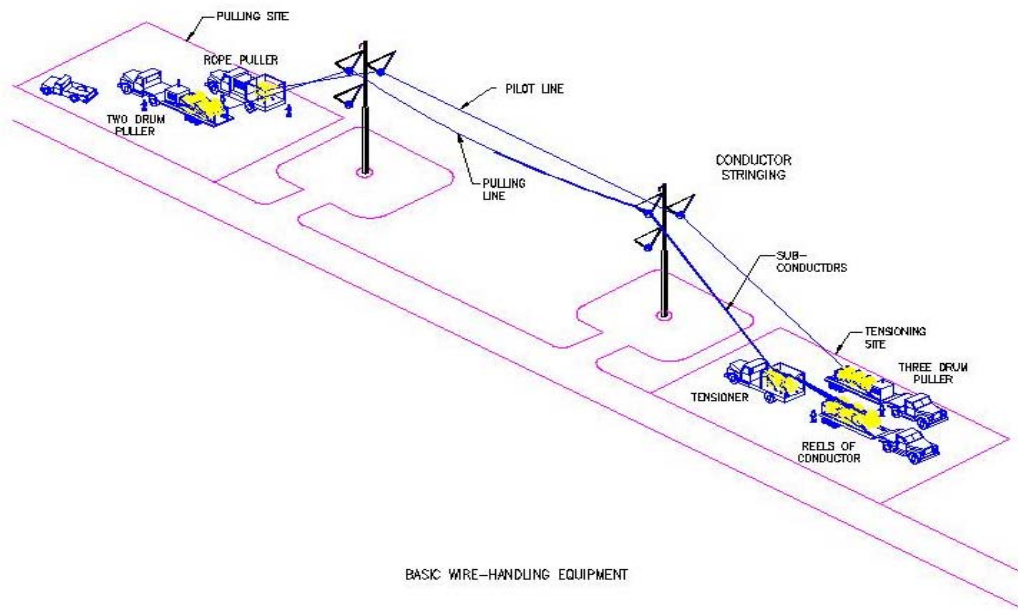


Figure 2.4-9 Basic Conductor Handling Equipment

Cleanup and Reclamation

Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout construction. Refuse and trash would be removed from the project area and disposed of in an approved manner. Oil, fuel, and chemicals would not be disposed of within the project areas. Open burning of construction trash would not occur within the project area. Upon completion of construction activities, the transmission line rights-of-way would be restored pursuant to an approved Restoration Plan. This plan would be submitted as part of the Plan of Development (POD).

Hazardous Materials Handling

Petroleum products, including gasoline, diesel fuel, crankcase oil, lubricants, and cleaning solvents, would be used to fuel, lubricate, and clean vehicles and equipment. These products would be stored in fuel trucks or approved containers. When not in use, hazardous materials would be properly stored to prevent accidental releases.

Enclosed containment systems would be provided for disposal of all trash in the work areas. All construction waste, including garbage, solid waste, and petroleum products, would be removed from the project area and disposed of at an authorized facility. All construction, operation, and maintenance activities would comply with all applicable federal, state, and local laws and regulations regarding the use of hazardous substances. The construction or maintenance crew foreman would be responsible for compliance with all applicable laws and regulations. A handling plan would be developed as part of the POD during the project engineering and pre-construction phases.

The presence of hazardous materials or hazardous wastes within the study corridor only becomes an issue when either these substances are improperly stored or handled or are encountered during excavation. The first scenario would be prevented by managing hazardous materials and wastes in accordance with applicable state and federal regulations as discussed above. Should the latter scenario occur, all applicable laws and regulations would be adhered to for reporting, transporting, and disposing of hazardous wastes.

Fire Protection

All applicable fire laws and regulations would be observed during the construction period. All personnel would be advised of their responsibilities under the applicable fire laws and regulations.

Construction Monitoring

An approved resource compliance program would be developed to address mitigation requirements associated with the avoidance of sensitive plant and animal species, cultural sites, or other sensitive features located within or adjacent to the Proposed Action. Resource protection measures committed to by NPC for this Proposed Action are described in the Mitigation Measures section at the end of this chapter. Prior to construction, these measures will be described in detail and included in the POD.

2.4.3 Construction Work Force and Schedule

The maximum total work force required for the construction activities described above is approximately 125 people. The estimated number of personnel and equipment required to construct the Proposed Action are presented in Table 2.4-3. NPC estimates that approximately 50 percent of the total construction work force would be hired locally. The project has an in-service date of June 1, 2010. Construction would begin in Fall 2008 so that all construction would be completed by June 1, 2010. Many existing NPC facilities would be taken out of service to allow for the safe construction of the new facilities. A detailed outage and construction schedule would be developed during final project design.

Table 2.4-3 Estimated Personnel and Equipment

Activity	People	Quantity of Equipment
Survey	4	2 pickup trucks
Access Road Construction	4-8	1 bulldozer (D-8 Cat) 2 motor graders 2 pickup trucks 2 water trucks (for construction and maintenance)
Footing/Foundation Installation	28	6 hole diggers 2 bulldozers 1 truck 6 concrete trucks 2 dump trucks 4 pickup trucks 1 carry all 1 hydro crane 1 wagon drill 2 water trucks

Activity	People	Quantity of Equipment
Structure Steel Haul	8-10	4 steel haul trucks 2 pickup trucks 2 yard and field cranes 1 fork lift 1 water truck
Structure Assembly (per crew)	10-12	1 pickup truck 2 carry alls 1 cranes (rubber tired) 1 truck (2 ton) 1 water truck
Structure Erection (per crew)	8-10	1 cranes (120 Ton) 1 truck (2 ton) 2 pickup trucks 1 carry all 1 water truck
Conductor Installation & Counterpoise	36	6 wire reel trailers 6 diesel tractors 4 cranes (2 19-Ton, 2 30-Ton) 2 trucks (5 ton) 4 Pickup trucks 4-6 large bucket trucks 2 splicing trucks 4 3-drum pullers (2 medium, 2 heavy) 1 Single Drum Puller (large) 1 Double bull-wheel tensioner (heavy) 2 sagging equipment (D-8 Cat) 4 carry all 2 static wire reel trailer 2 water trucks
Site Clean-Up	8-10	3 trucks 1 pickup truck 1 D-6 Cat 1 water truck
Road Rehabilitation (Right-of-Way Restoration)	4	1 bulldozer 1 motor grader 2 pickup trucks 1 water truck

2.4.4 Operation and Maintenance Activities

Operational Characteristics

The nominal voltage for the proposed transmission lines would be 500kV, 230kV, 138kV, and 69kV. Voltages could vary by up to five percent depending upon load flow.

Permitted Uses

After the transmission line has been energized, compatible land uses that comply with local regulations could be permitted within and adjacent to the transmission line rights-of-way. Incompatible land uses include construction and maintenance of inhabited dwellings, buildings, or other uses that would conflict with NESC requirements, and any use that would affect

electrical clearances by altering surface elevations. Permission to use the right-of-way on private lands would have to be obtained from NPC.

Safety

Safety is a primary concern in the design and operation of the proposed transmission lines. The transmission lines would be protected with power circuit breakers and related line relay protection equipment. If conductor failure occurs, power would be automatically removed from the line. Lightning protection would be provided by overhead ground wires along the line. Electrical equipment and fencing at the substation would be grounded. All fences, metal gates, pipelines, etc., within the transmission line right-of-way would be grounded to prevent electrical shock. Grounding outside of the right-of-way may also be necessary, and would be determined during final project design.

Right-of-Way Maintenance

NPC would maintain the right-of-way in accordance with Reclamation and BLM stipulations. The transmission lines would be regularly inspected by ground and/or air patrols. Maintenance would be performed as needed. When access is required for non-emergency maintenance and repairs, NPC would adhere to the same precautions that were taken during construction.

Emergency maintenance would involve prompt movement of crews to repair or replace any damage. Crews would be instructed to protect plants, wildlife, and other sensitive environmental resources. Restoration procedures following completion of repair work would be similar to those prescribed for construction. The comfort and safety of local residents would be maintained by limiting noise, dust, and other hazards during maintenance and emergency repair activities.

Abandonment

The transmission lines would be abandoned if the facilities were no longer required. Subsequently, conductors, insulators, and hardware would be dismantled and removed from the rights-of-way. Structures would be removed and the foundations broken off below the ground surface. Following abandonment and removal of the transmission line, all disturbed areas would be restored and rehabilitated to their original condition.

2.4.5 Mitigation Measures

NPC has incorporated a variety of mitigation measures into the Proposed Action in an effort to avoid and minimize potential adverse environment effects resulting from the construction, operation, and maintenance of the Project. These mitigation measures are described in Table 2.4-4. Chapter 4 presents a detailed assessment of the potential environmental impacts that could result from the Proposed Action and describes how the mitigation measures would avoid or reduce potential impacts. Resource-specific mitigation measures would be incorporated into the Proposed Action and would be applied on a case-by-case basis. All mitigation measures would be identified in detail in the POD.

Linear electric transmission line projects are relatively flexible in their ultimate location and configuration compared to non-linear projects. Specifically, the locations of transmission line structures can be moved and span lengths modified in order to protect sensitive resources and minimize environmental impacts. The transmission lines associated with the Proposed Action cross sensitive environmental features. While every effort has been made in this EA to identify and mitigate potential environmental impacts associated with the Project, the ability to modify the project design during construction represents an additional mitigation measure that would

contribute to minimize impacts to sensitive environmental resources while maintaining overall project feasibility.

Table 2.4-4 Resource-Specific Mitigation Measures

Resource	Mitigation Measure
Land Use, Recreation, and Transportation	
LMM-1	Comply with county and city noise ordinances.
LMM-2	Provide advanced notice of construction to affected residences, businesses, and public facilities.
LMM-3	Coordinate with public agencies regarding crossings of public wastewater treatment plants and floodway channels.
RMM-1	Coordinate construction schedules with recreation managers of affected recreation areas to avoid peak usage periods and notify users of construction.
RMM-2	Permanently close and revegetate temporary construction roads no longer used by NPC. For roads still in use, restrict access by unauthorized users (e.g., illegal OHV use).
TMM-1	Obtain encroachment permits or similar authorizations from applicable regional, state, and local transportation agencies including school districts when streets are used for more than normal traffic purposes, or where a traffic control plan is required.
TMM-2	Repair any damaged road ROWs.
Visual Resources	
VRMM-1	Construction vehicle movement outside the ROW on dirt roads normally would be restricted to pre-designated routes or contractor-approved routes. Should unforeseeable circumstances occur during construction that require more road access than initially requested; permission must be granted by the land manager prior to disturbance and appropriate remuneration fees would be assessed.
VRMM-2	To minimize ground disturbance and/or reduce scarring (visual contrast) of the landscape, the alignment of any new access roads or cross-country route would follow the landform contours in designated areas where practicable, providing that such alignment does not impact resource values additionally.
VRMM-3	To minimize amount of sensitive features disturbed and/or reduce visual contrast; structures would be placed in designated areas so as to avoid sensitive features such as, but not limited to, riparian areas, water courses, and cultural sites, and/or to allow conductors to clearly span the features, within limits of standard tower design. If the sensitive features cannot be completely avoided, towers would be placed so as to minimize the disturbance.
VRMM-4	To reduce visual impacts, tower structures would be placed at the maximum feasible distance from highway, roadway, and trail crossings, and where preservation of existing vista(s) are particularly important to land management agencies. Distances would be within the limits of standard tower structure design.
VRMM-5	Non-reflective neutral gray colored paints and coatings approved by BLM and Reclamation would be used to reduce reflection, glare, and/or contrast on monopole structures. Coated galvanized metallic surfaces would be used to prevent oxidation and reduce visual contrast.

VRMM-6	No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate limits of survey or construction activity.
VRMM-7	In construction areas where re-contouring is not required, vegetation would be left in place wherever possible and original contour would be maintained to avoid excessive root damage and allow for re-sprouting.
VRMM-8	In temporary construction areas (e.g., pull and tension sites, structure sites) where ground disturbance is substantial or where re-contouring is required, surface restoration would occur as required by the land management agency. The method of restoration normally would consist of removing and stockpiling topsoil and large rocks from disturbed areas to return temporarily disturbed areas back to original contours. Other methods may include reseeding (if required), installing cross drains for erosion control, placing water bars in the road and filling ditches.
VRMM-9	Roads would be built at right angles to the washes to the extent practicable. Culverts would be installed where needed. All construction and maintenance activities would be conducted in a manner that would minimize disturbance to vegetation and drainage channels. All existing roads would be left in a condition equal to or better than their condition prior to the construction of the transmission line. Berms shall not exceed 2 feet in width or 1 foot in height and shall be flattened at the top to allow for re-establishment of vegetation. Rock staining would be considered where road cuts are visible from a distance.
VRMM-10	No debris would be left in the ROW.
VRMM-11	Non-specular conductors would be used to reduce visual impacts.
VRMM-12	The contractor would use weed-free, native seed mixes (where available) in areas where revegetation is required and in accordance with a BLM and Reclamation approved Restoration Plan. No species on the "state noxious weed list" would be included in the revegetation seed mixes.
VRMM-13	In compliance with the Clark County Department of Air Quality Management (DAQM) dust permit, all roads and structure pads would be treated with chemical dust suppressant or watered prior to and during all construction activities. Project personnel would be educated on the site dust mitigation plan.
Biological Resources (Vegetation and Wildlife)	
VMM-1	No construction of new roads or upgrading of existing access roads beyond road prism would occur in areas identified for or adjacent to Las Vegas bearpoppy restoration.
VMM-2	Minimal construction of new roads or upgrading of existing access roads would occur in areas identified as sensitive plant habitat.
VMM-3	In designated areas, sensitive plants and/or habitat would be flagged and structures would be placed to allow spanning of these features, where feasible, within limits of standard structure design.
VMM-4	All new access roads not required for maintenance would be permanently closed using methods approved by the landowner/manager (e.g., stockpiling and replacing topsoil, or rock replacement).

VMM-5	Temporary disturbance would be restored using grasses, forbs, cacti and yucca originally salvaged from the site. The material would be salvaged by an experienced contractor, stockpiled in an area approved by Reclamation/BLM within the right-of-way, and then transplanted to reclaimed sites. Reclamation/BLM's protocols for proper maintenance of the material would be followed. Restoration would be in accordance with a Reclamation/BLM approved plan.
WMM-1	Proposed mitigation measures were developed based on terms and conditions of other federal biological opinions for the desert tortoise. Terms and conditions of the biological opinion rendered through formal consultation with the FWS would be implemented during all Project related activities. These mitigation measures may include at a minimum: education in desert tortoise protection measures for construction personnel; surveys to remove tortoises from construction zones immediately before construction; implementation of a litter control program; construction monitoring by qualified biologist; and habitat compensation within the Las Vegas Field Office of the BLM.
WMM-2	In designated areas, structures would be placed to avoid sensitive wildlife and/or to allow conductors to clearly span the features, within limits of standard structure design.
WMM-3	If construction of the project is not begun until after the commencement of burrowing owl breeding season (mid-March-August), all burrows, holes, crevices, or other cavities on the construction site would be collapsed after a qualified biologist thoroughly checks them for inhabitants. This would discourage owls from breeding on the construction site. If authorization for the plan is not provided until after the commencement of breeding season and burrowing owls can be seen within the area during surveys, behavioral observations would be done by a qualified biologist to determine their breeding status. If breeding behavior is observed, an area large enough to prevent disturbance to the adults (as determined by Reclamation/BLM) would be avoided until the chicks fledge to ensure the chicks do not abandon the nest.
WMM-4	In compliance with Nevada Administrative Codes regarding protection of the gila monster, standard NDOW protocols would be followed if a gila monster is encountered during construction activities.
WMM-5	Survey suitable habitat for threatened and endangered riparian bird species that could potentially occur in this area. Upon confirmation of threatened and endangered riparian bird species presence, complete protocol surveys for these species. Restrict construction activities in Las Vegas Wash from May-June, until protocol surveys are complete. If the species are determined to be breeding conform to WMM-6.
WMM-6	Restrict construction activities in the Las Vegas Wash from May-September for confirmed nesting threatened and endangered riparian bird species that could potentially occur in this area.
WMM-7	Preconstruction avian surveys would be conducted to locate breeding and nesting bird species in the construction ROW and areas adjacent (up to 200 feet from the ROW edge) to the ROW where access is available. Nest and breeding locations would be surveyed using GPS and flagged and buffered by an appropriate distance as determined by the BLM and Reclamation for avoidance from March 15 – August 15. Surveyed areas with no documented nests would

	permit construction activities. If additional nest(s) are found during construction, the onsite biological monitor would record the nest, flag, and buffer the area for avoidance.
Cultural Resources	
CR-1	Intensive pedestrian inventory would be conducted for all unsurveyed portions of the preferred alternative. This, combined with previous research in the area, would create a comprehensive data set detailing all historic properties along the selected alignment.
CR-2	If any historic properties are located in the APE and cannot be avoided by project redesign or access road restrictions, mitigation would be completed in accordance with the PA.
Paleontological Resources	
PRMM-1	Prior to project construction, a pedestrian survey of the selected APE should be conducted by a qualified and BLM-permitted paleontologist. In areas underlain by PFYC <i>Class 4/5</i> and <i>Class 5</i> geologic units, a 100% survey should be conducted by a BLM-permitted paleontologist (Field Supervisor and/or Principal Investigator). In all areas underlain by PFYC <i>Class 3</i> , a partial survey should be conducted in areas determined by the paleontologist to be potentially sensitive for fossil resources. Based on the results of the survey, additional paleontological mitigation may be recommended, including pre-construction sampling and/or salvage of known fossil localities.
PRMM-2	Paleontological construction monitoring in areas determined to have a high paleontological sensitivity should be performed by a qualified paleontological monitor under the supervision of a BLM-permitted Principal Investigator. Paleontological monitoring would include inspection of exposed rock units and microscopic examination of matrix to determine if fossils are present. This work would take place during surface disturbing activities such as grading for the construction of access roads, transmission line structures, and other associated facilities.
PRMM-3	In the laboratory, all fossils discovered would be prepared, identified, inventoried, and a determination of significance made. Specimen preparation and stabilization methods would be recorded for use by the paleontological repository. All fossil specimens would then be transferred to a public museum or other approved paleontological repository accompanied by a copy of the final paleontological monitoring report and all data in hard and electronic copy.
PRMM-4	A final paleontological monitoring report would be prepared and would provide all information requested in the BLM paleontological resources manual (Handbook H-8270-1 [1998]). This would include, but not be limited to, a discussion of the results of the mitigation-monitoring plan, an evaluation and analysis of the fossils collected (including an assessment of their significance, age and geologic context), an itemized inventory of fossils collected, a confidential appendix of locality and specimen data with locality maps and photographs, an appendix of curation agreements and other appropriate communications.
Air Quality	
AQMM-1	Implement Best Available Control Measures (BACM) for the purposes of dust control as applicable.
AQMM-2	Prohibit construction grading on days when wind conditions cause fugitive dust emissions.
AQMM-3	Treat unpaved roads and/or disturbed soil areas with a dust suppressant or by

	watering as necessary.
AQMM-4	Stabilize exposed soils in inactive construction areas as necessary.
AQMM-5	Cover soil stockpiles and trucks hauling soil or other loose material when on public roads.
AQMM-6	Minimize construction equipment and support vehicle idling time where feasible.
AQMM-7	Schedule of materials delivery to construction sites during off-peak hours to the extent feasible.
AQMM-8	If suitable, encourage construction workers to use park and ride facilities where available and carpool.
Topography, Geology and Soils	
GSMM-1	Segregation of soil horizons should be conducted where soils will be disturbed. At a minimum, the initial 3 inches of the surficial horizon should be segregated and stockpiled from lower horizons. This soil containing seed bank should be used for stabilization.
GSMM-2	The limits of disturbance should be defined and no additional disturbance allowed outside of these areas without the approval of the authorized officer.
GSMM-3	Use mulch to stabilize disturbed areas where severely erosive soils will be encountered.
GSMM-4	Reseed areas with a seed mix approved by the authorized officer to permanently stabilize disturbed areas.
Water Resources	
WRMM-1	Span the Las Vegas Wash and associated floodplain.
WRMM-2	Implement BMPs to prevent and minimize stormwater runoff from construction sites.
WRMM-3	Stabilize exposed soils in inactive construction areas as necessary.
WRMM-4	Confine construction activities to surveyed areas.
Health, Safety and Noise	
HSMM-1	Existing SPCC Plans for the modified substations would be amended to include the modifications.
HSMM-2	Construction would be performed in accordance with NPC's construction SWPPP which addresses proper storage, management, and disposal of construction and hazardous waste.
HSMM-3	On-site personnel shall be trained in oil spill prevention and control.
HSMM-4	Spill supplies and equipment would be readily available at the construction site to respond to and cleanup accidental spills to prevent contamination of soils, surface waters, and groundwater.
HSMM-5	Respond to and investigate complaints of radio or television interference generated by the transmission lines. A bundle configuration and large diameter conductors would be used to limit radio and television interference due to corona.
HSMM-6	Fences or other conductive objects in the ROW would be grounded per NPC engineering construction standards to eliminate problems of induced currents.
Noise	
NMM-1	Notify local residents prior to any blasting or implosions during construction.
NMM-2	Comply with county and city noise ordinances.
NMM-3	Coordinate with authorized officer of Wetlands Park to schedule construction activities outside heavy periods of recreational use.

2.5 SUMMARY COMPARISON OF ENVIRONMENTAL CONSEQUENCES

A comparison of impacts for the alternatives was made and is summarized in Table 2.5-1.

Table 2.5-1 Summary Comparison of Potential Impacts from No Action and Proposed Action Alternatives

Resource	No Action	Proposed Action			
		Alt 1	Alt 2	Alt 3	Alt 4 (Preferred)
Land Use, Recreation, and Transportation	No impacts to land use, recreation, and transportation	<p>Short-term, direct impacts on existing land uses associated with dust and traffic during construction</p> <p>Long-term, direct impacts to land use from preclusion and/or conflicts with existing and/or planned land uses</p>	Same as Alt 1	Same as Alt 1	Same as Alt 1
Visual	No impacts to visual resources.	<p>Long-term, high, adverse impacts to visual resources for residences on the northwest end of the Project and long-term, moderate, adverse impacts to other residential viewers.</p> <p>Alt 1 would cause the greatest long-term, adverse impacts to BLM public lands and recreationists and Class A scenic quality landscapes. Landform contrasts not associated with the other alternatives would be created by the need for substantial road construction</p>	<p>Impacts to residences are the same as Alt 1.</p> <p>Alt 2 would cause long-term, moderate, adverse scenic quality impacts to the Rainbow Gardens ACEC.</p>	Same as Alt 2; however, impacts to Wetlands Park viewers would be slightly greater than Alt 2.	Alt 4 would cause the greatest long-term, adverse impacts to residential and recreational viewers and Wetlands Park viewers. Scenic quality impacts similar to Alt 2.

Resource	No Action	Proposed Action			
		Alt 1	Alt 2	Alt 3	Alt 4 (Preferred)
Biological	No Impacts to biological resources	<p>Low, direct impacts to vegetation including special status plant species from construction and maintenance.</p> <p>Low impacts to Las Vegas bearpoppy from construction and maintenance.</p> <p>Low impacts to general wildlife and special status species except the desert tortoise from construction, and maintenance.</p> <p>Adverse impacts to the desert tortoise from construction, and maintenance.</p> <p>Greatest amount of Mojave mixed-shrub disturbance from construction.</p> <p>Second highest amount of creosote-bursage habitat disturbance.</p>	<p>Impacts to vegetation same as Alt 1.</p> <p>Moderate impacts to Las Vegas bearpoppy from construction and maintenance.</p> <p>Impacts to wildlife same as Alt 1</p> <p>Adverse impacts to the desert tortoise from construction, and maintenance.</p> <p>Least amount of Mojave mixed-shrub habitat disturbance from construction.</p> <p>Greatest amount of creosote-bursage habitat disturbance from construction.</p>	<p>Impacts to vegetation same as Alt 1.</p> <p>Low impacts to Las Vegas bearpoppy from construction and maintenance.</p> <p>Impacts to wildlife same as Alt 1.</p> <p>Adverse impacts to the desert tortoise from construction and maintenance.</p> <p>Mojave mixed-shrub habitat disturbance same as Alt 2.</p> <p>Second lowest amount of creosote-bursage habitat disturbance.</p>	<p>Impacts to vegetation same as Alt 1.</p> <p>Low impacts to Las Vegas bearpoppy from construction and maintenance.</p> <p>Impacts to wildlife same as Alt 1.</p> <p>Adverse impacts to the desert tortoise from construction and maintenance.</p> <p>Mojave mixed-shrub habitat disturbance same as Alt 2.</p> <p>Third lowest amount of creosote-bursage habitat disturbance</p>

Resource	No Action	Proposed Action			
		Alt 1	Alt 2	Alt 3	Alt 4 (Preferred)
Cultural	Cultural resources would be preserved <i>in situ</i> , subjected only to natural processes: erosion, deflation, etc.	<p>Permanent impacts on cultural resources will come from construction-related activities and ground disturbance. Indirect effects from increased foot and vehicle traffic to the area may result from improved roads – leading to a greater likelihood of vandalism and looting.</p> <p>Alt 1 will have a permanent impact on at least one historic property. It is also highly likely that other historic properties are located along Alt 1, which has the second lowest area of ground disturbance.</p>	<p>Similar impacts from construction related activities and increased access.</p> <p>Alt 2 will have a permanent impact on at least two historic properties. It is also highly likely that other historic properties are located along Alt 2, which has the greatest area of ground disturbance.</p>	<p>Similar impacts from construction related activities and increased access.</p> <p>Alt 3 will have a permanent impact on at least two historic properties. It is also highly likely that other historic properties are located along Alt 3, which has the least area of ground disturbance.</p>	<p>Similar impacts from construction related activities and increased access.</p> <p>Alt 4 will have a permanent impact on at least three historic properties. It is also highly likely that other historic properties are located along Alt 4, which has the second greatest area of ground disturbance.</p>
Paleontological	Paleontological resources would be preserved <i>in situ</i> , subjected only to natural processes: erosion, deflation, etc.	<p>Permanent impacts on paleontological resources from construction activities. Ground disturbance may unearth fossils. Indirect effects include increased foot and vehicle traffic via improved roads – leading to a greater likelihood of vandalism or unlawful collecting.</p> <p>Alt 1 has the greatest total number of acres underlain by highly sensitive geologic units</p>	<p>Similar impacts from construction related activities and increased access.</p> <p>Alt 2 has the lowest number of total acres underlain by highly sensitive geologic units.</p>	<p>Similar impacts from construction related activities and increased access.</p> <p>Alt 3 has the second highest total number of acres underlain by highly sensitive geologic units.</p>	<p>Similar impacts from construction related activities and increased access</p> <p>Alt 4 has the third highest total number of acres underlain by highly sensitive geologic units.</p>

Resource	No Action	Proposed Action			
		Alt 1	Alt 2	Alt 3	Alt 4 (Preferred)
Air Quality	No impacts to air quality	Temporary, minor, adverse impacts on air quality during construction due to emissions generated by heavy equipment and support vehicles and fugitive dust from soil disturbance and wind entrainment. No impacts to air quality from project operation and maintenance.	Same as Alt 1	Same as Alt 1	Same as Alt 1
Topology, Geology, and Soils	No impacts to topography, geology, and soils	Short-term, minor impacts to geology Short-term, moderate impacts to soils during construction from increased wind and water erosion	Same as Alt 1	Same as Alt 1	Same as Alt 1
Water	No impacts to water resources	Short-term, minor, indirect adverse impacts to water resources during construction from storm water discharge to Las Vegas Wash. No impacts to water resources from project operation and maintenance.	Same as Alt 1; however, Alt 2 would cause the greatest area of ground disturbance and therefore have the greatest potential for adverse impacts to water resources from storm water discharge to Las Vegas Wash.	Same as Alt 1	Same as Alt 1
Health, Safety and Noise	No impacts to health, safety and noise	Potential environmental contamination from accidental hazardous material spills, and noise	Same as Alt 1	Same as Alt 1	Same as Alt 1

Resource	No Action	Proposed Action			
		Alt 1	Alt 2	Alt 3	Alt 4 (Preferred)
Socioeconomics	Potential for significant impacts on areas economy from failure to provide an electrical system of adequate capacity and reliability	Long-term benefits to the economy from maintaining reliable electric power service for growing demand No impacts on population, housing, environmental justice and public services	Same as Alt 1	Same as Alt 1	Same as Alt 1

CHAPTER 3 AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the existing conditions for each environmental resource that could be affected by any of the alternatives considered in this EA. It forms the scientific and analytic basis for comparison of alternatives described in the previous section.

3.2 LAND USE, RECREATION, AND TRANSPORTATION

3.2.1 Project Setting and Methodology

The study area is located in the eastern Las Vegas Valley and encompasses a portion of the City of Henderson as well as unincorporated areas of Clark County. Rapid population growth in the study area has resulted in substantial development and accompanying changes in land use. The study area contains a variety of landscape types, urban and rural development, and numerous federal, state, and local land management agencies.

The study area was defined as a 3-mile wide corridor (1.5 miles on each side of the assumed centerline) along the four alternative 500kV transmission line alignments and two 230kV transmission line alignments. Information on land uses in the study area was collected from planning documents, communication with agencies, and field reconnaissance. Geographic Information System (GIS) data and aerial photography were also collected in addition to reviewing master title plats and other records at the BLM Las Vegas Field Office.

3.2.2 Land Jurisdiction

Land jurisdiction refers to the administrative authority of federal, state, or local governmental agencies. Jurisdiction does not necessarily imply land ownership. For example, lands within the Clark County Wetlands Park are primarily owned by Reclamation but are managed by Clark County. The boundaries of land jurisdiction were identified and delineated using BLM and Clark County GIS data layers and municipal maps. Collectively, the 500kV transmission line alternative corridors and 230kV transmission line corridors traverse lands administered by Reclamation, BLM, Clark County, City of Henderson, City of Las Vegas, and private landowners (Figure 3.2-1). Reclamation is the lead federal agency for the NEPA process on this Project.

Federal

Reclamation and the BLM administer federal public lands throughout the Las Vegas Valley, including most of the lands in the Project area (Figure 3.2-1). Land management mandates for these agencies include fostering judicious use of land and water resources, protecting fish and wildlife, preserving environmental and cultural values, providing for recreation, and managing energy and mineral resources. The Project area is within the Robert B. Griffith Water Project. Allowable uses are those that are compatible with project purposes.

The Southern Nevada Public Lands Management Act (SNPLMA) authorized the BLM to dispose of public land within the Las Vegas Valley through a competitive bidding process. Lands within the disposal area boundary are withdrawn from entry under the Mining Law, leasing of mineral rights, or granting other rights that would encumber the land prior to disposal. The SNPLMA also allows BLM to sell disposal lands to state or local governments for affordable housing purposes. BLM land east of Hollywood Boulevard and south of Vegas Valley Drive (Figure 3.2-1) has been identified as a potential affordable housing site. Clark County is currently determining the development potential of this land.

Figure 3.2-1 Land Use Resources
See CD

The BLM may also sell or convey land in the disposal area under the authority of the Recreation and Public Purposes Act, which authorizes the sale or lease of public lands to state and local governments and qualified nonprofit organizations for recreational or public purposes. Land is conveyed subject to valid existing rights and does not preclude existing authorized uses of public lands such as rights-of-way, leases, and recreation and public purposes.

State

Lands held by the State of Nevada in the study area include areas managed by the Nevada Department of Transportation (NDOT).

Local

The local government category includes cities and counties that have the authority to plan and control land uses within their jurisdiction through the development of land use planning and zoning ordinances. The study area is located entirely within Clark County, and a portion is within the City of Henderson (Figure 3.2-1).

Private lands in the study area generally consist of residential communities and commercial/industrial areas.

3.2.3 Existing Land Uses

Overview

The study area includes portions of the City of Henderson, Town of Whitney, and Town of Sunrise Manor. Henderson, which was historically dominated by a large industrial complex and older residential neighborhoods, is the fastest growing city in Nevada and is highly developed with a number of master planned communities, including Calico Ridge, Tuscany Hills, Weston Hills, South Valley Ranch, and Lake Las Vegas. Sunrise Manor is primarily multi-family residential and commercial (office and retail). Some single-family residential and industrial areas also exist. Whitney contains a large amount of undeveloped land administered by the BLM and is unavailable for development due to steep terrain. Whitney's residential areas consist of multi-family and residential development of varying densities. Public facilities are also found in the study area as well as an AM radio station that consists of a building and four towers that are 199 feet tall (Figure 3.2-1). There is no agriculture or prime or unique farmlands in the study area.

Parks, golf courses, and schools are also scattered throughout the study area. The 2,900-acre Clark County Wetlands Park and the Las Vegas Wash are located in the center of the Project area (Figure 3.2-1). The Wetlands Park includes a 130-acre nature preserve, a Visitor and Education Center, and pedestrian and equestrian trail systems. Portions of the Project area are located within BLM's Rainbow Gardens ACEC. This area was designated to protect the Las Vegas bearpoppy and unique geologic resources, and is used extensively for a variety of recreational activities.

500kV Transmission Line

The alternative 500kV transmission line alternative corridors are primarily located on lands owned or managed by Reclamation and BLM (Figure 3.2-1). All four routes cross a Designed Manufacturing District (M-D) zoned facility (Manheim's Greater Las Vegas Auto Auction).

Residential development adjacent to the 500kV transmission line alternative corridors include Lake Las Vegas, Desert Inn Master Planned Community (Desert Inn Master Plan), Riverwalk, Sunrise Meadows, Sahara Summit, and Sahara Sunrise. Public facilities crossed by or adjacent to

the routes include the City of Las Vegas Water Pollution Control Facility (WPCF), the Clark County Water Reclamation District Central Plant (CP), and the Clark County Water Reclamation District Advanced Wastewater Treatment Facility (AWT). Utilities within the study area include water lines, natural gas lines, electric distribution lines, and sewer lines. Several flood control facilities exist along the Las Vegas Wash. The majority of these facilities are conveyances (channels) and erosion control and bank protection structures. Major roads within the 500kV transmission line alternative corridors include Desert Inn Road, Flamingo Road, Vegas Valley Drive, Hollywood Boulevard, Pabco Road, and Lake Las Vegas Parkway. There are no active mining claims situated in the corridors.

230kV Transmission Lines

The 230kV transmission line routes, are for the most part, located on lands owned or managed by Reclamation and private entities (Figure 3.2-1). Commercial uses occur primarily along Boulder Highway and Lake Mead Parkway. Approximately 2.5 miles of the Sunrise-Equestrian 230kV route traverses the Clark County Wetlands Park. Existing land uses within the Wetlands Park include open space and recreation. Golf courses crossed by the 230kV transmission line routes include Tuscany Golf Club, Stallion Mountain Country Club, and Royal Links Golf Club. The Sunrise-Clark 230kV transmission line route does not cross the Tuscany Golf Club.

Residential development adjacent to the Sunrise-Equestrian 230kV transmission line route includes residences associated with the City of Henderson Foothills Planning Area, Glassburn-Corn Subdivision, Palm City, Tuscany, Weston Hills, Desert Inn Master Planned Community (Desert Inn Master Plan), Stallion Mountain Estates 2, The Enclave at Stallion Mountain, Sunrise Meadows, Sahara Summit, and Sahara Sunrise.

Residential development adjacent to the Sunrise-Clark 230kV transmission line route includes apartments, mobile home parks, and single family residences. Specific developments include Sunrise Meadows, Sahara Summit, Sahara Sunrise, Vegas Valley and Sloan, Stallion Mountain Estates 2, Stallion Mountain, The Enclave at Stallion Mountain, Rose Garden Estates, Barry Acres, Kisling Gardens, Unrecorded Whitney Tract, Nevada Estates, Wexford at Canyon Springs, Villas at Tropicana 2, Canyon Willow East, Monterey Gardens No. 1, and Bunch Tract No. 2.

Utilities within the study area include water lines, natural gas lines, electric distribution lines, sewer lines, and flood control facilities along the Las Vegas Wash. Major roads within the 230kV transmission line corridors include Interstate 15, Boulder Highway (SR 582), Desert Inn Road, Flamingo Road, Tropicana Avenue, Russell Road, Vegas Valley Drive, Hollywood Boulevard, Pabco Road, and Lake Las Vegas Parkway. There are no active mining claims situated in the 230kV transmission line corridors.

Air Facilities

The inventory of air facilities included public, private, and military airports as identified from the U.S. Department of Transportation, Federal Aviation Administration, and Las Vegas Sectional Aeronautical Chart. The inventory also included Nellis Air Force Base Height Restriction Contours, Runway Protection Zones, and Accident Potential Zones. According to the Clark County Nellis Air Force Base Air Space Zoning Map, dated March 4, 1998, portions of all of the 500kV transmission line alternative corridors and the 230kV transmission line corridors are located within the 2,363 MSL height-limiting zone.

Two City of Henderson emergency helicopter landing sites were identified in the study area. One of the sites is located at Racetrack Road and Burkholder Boulevard, the other site is located at Lake Mead Parkway and Pueblo Boulevard.

Transportation

The transportation network in the study area includes principal regional highways and streets (arterial, collector, and local) that generally follow the Las Vegas square-mile grid pattern (Figure 3.2-1). Principal regional highways in the vicinity of the Project include U.S. 93, Boulder Highway (SR 582), Lake Mead Parkway (SR 146), and Lake Mead Boulevard (SR 147). Local arterials in the vicinity of the Project include Hollywood Boulevard, Vegas Valley Drive, Desert Inn Road, Flamingo Road, Tropicana Avenue, Lake Las Vegas Parkway, Montelago Boulevard, Pabco Road, and Rebel Road.

Hollywood Boulevard provides access to the northern portion of the Project area. This road turns into Telephone Line Road just east of the AWT. The majority of the traffic on these roads consists of construction and maintenance vehicles (e.g., trucks and large earth-moving equipment) accessing the Las Vegas Wash and the AWT facility. Three BLM roads, Kodachrome Road, Rainbow Gardens Road, and Lava Butte Road, provide access into the Rainbow Gardens ACEC from Telephone Line Road. Traffic on these roads is minimal, and primarily consists of recreational vehicles.

Planned roadway improvements in the study area include widening Lake Mead Parkway to six lanes, a Trail Corridor and Trail Beautification project along Lake Mead Parkway, and widening portions of Burkholder Boulevard and Racetrack Road to four lanes.

Other transportation resources within the Project area include non-motorized transportation facilities including bicycle paths, pedestrian sidewalks and trails, and horse trails. A large number of on-street bicycle facilities (bike lanes and routes) are proposed on roadways within the project area, some of which involve Boulder Highway, Vegas Valley Drive, Desert Inn Road, Flamingo Road, Hollywood Boulevard, Lake Mead Boulevard, Racetrack Road, Pabco Road, Calico Ridge Drive, and the River Mountain Loop Trail. The Southern Nevada Water Authority Utility Corridor is the only off-street bicycle facility in the study area.

Mineral Resources

The primary mineral resources in the study area are sand and gravel, and there is one BLM community pit (East Community Pit) in the area (Figure 3.2-1). Sand and gravel have been mined in the East Community Pit since the late 1980's, and approximately 200 acres have been affected to date. The Clark County Public Works Department has a Free Use Permit (N-77940) for approximately 40 acres in the Pit. It is estimated that up to 100 acres of materials will be removed from the East Community Pit over the next 10 years. There are no gypsum mines or active oil and gas leases within the study area. BLM data indicate that there are nine active placer mining claims within the study area. None of these claims are crossed by the 500kV transmission line alternative routes or the 230kV transmission line routes.

Flood Control Facilities

The Las Vegas Wash represents the primary flood conveyance structure in the Project area. Several flood control facilities exist along the Las Vegas Wash. The majority of these facilities are conveyances (i.e., Flamingo Wash, Range Wash, various C-1 Channels, and Nellis Flamingo

Storm Drain). The SNWA has constructed and maintains numerous erosion control structures (ECSs) along the Wash. The project area also includes the C-1 basin project.

Utilities

Utilities within the Project area include water main and distribution lines, natural gas distribution lines, electric power distribution lines, and sewer lines. Telephone/internet/television service providers in the study area include Embarq and Cox Communications. Southwest Gas provides natural gas service to the study area through a series of major and minor service lines. NPC provides electrical power service to the study area.

Solid waste from the study area is collected by Republic Services and is transferred to the Apex Regional Waste Management Center located in northeast Clark County. Abbie's Recycling Center, which is located in the study area, accepts aluminum, appliances, auto batteries and scrap metal. There are two closed solid waste landfills in the study area (Figure 3.2-1). The 720-acre Sunrise Landfill is located between Desert Inn Road and Charleston Boulevard, approximately 1 mile east of Hollywood Boulevard. A BLM Recreation and Public Purpose lease on approximately 709 acres of the landfill is held by Clark County, which is considering developing the site for public recreational purposes. The 144-acre Henderson landfill is located south of the Las Vegas Wash adjacent to Calico Ridge. The landfill is designated as open space in the Henderson Open Space Plan.

The SNWA provides potable water throughout southern Nevada, including the study area. SNWA members include the Las Vegas Valley Water District, the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City, the Big Bend Water District in Laughlin, and the Clark County Water Reclamation District. The major SNWA facilities in the vicinity of the study area include the East Valley Lateral, South Valley Lateral, River Mountains Water Treatment Facility, and several smaller laterals.

Wastewater treatment plants in the study area include the City of Las Vegas WPCF, the Clark County Water Reclamation District CP, the Clark County Water Reclamation District AWT Facility, and the City of Henderson Water Reclamation Facility (WRF) (Figure 3.2-1). The Clark County Water Reclamation District provides the primary sanitary sewer service to the study area through a series of collection lines, lift stations, and treatment plants. The WPCF is located at 6005 East Vegas Valley Drive and discharges effluent into the Las Vegas Wash. The CP and AWT facility are located to the east and west of the Wash near the intersection of Flamingo Road and Hollywood Boulevard. The WRF is located south of Wetlands Park in the City of Henderson.

3.2.4 Existing Zoning

Clark County

Clark County zoning districts traversed by the 500kV transmission line alternative routes and 230kV transmission line routes include Public Facility (P-F), Rural Estates Residential (R-E), Medium Density Residential (R-2), Single-Family Residential (R-1), Open Spaces (O-S), Industrial-Without Dwelling (M-2), Designed Manufacturing (M-D), and Light Manufacturing (M-1)-Approved Zoning RUD. Title 30 of the Clark County Unified Development Code sets forth the regulations pertaining to these districts. Public Utility Structures, including transmission lines 34.5kV or greater, require a conditional use permit or special use permit in all districts.

City of Henderson

City of Henderson zoning districts traversed by the 230kV transmission line routes include Rural Estates Residential (RS-1A), Community Commercial (CC), Designated Holding District (DH), Industrial Park (IP), Public/Semipublic District (PS), and Neighborhood Commercial (CN). The City also has a Transmission Line Overlay District that is applicable to all zoning districts. Development regulations in the District include a maximum of six high-voltage transmission lines in the designated utility corridor and a requirement to mitigate the physical and visual impacts of high-voltage transmission lines. A conditional use permit would be required for the 230kV transmission lines.

3.2.5 Land Use Plans

Federal Plans

BLM Las Vegas Resource Management Plan (RMP)

The 1998 Las Vegas RMP provides a comprehensive framework for managing approximately 3.3 million acres of public lands administered by the BLM Las Vegas Field Office. Significant resources and program emphases in the plan include the Rainbow Gardens ACEC, visual resource management, land disposal actions, special status species and wildlife habitat, riparian areas, hazardous materials management, rights-of-way, cultural resources, recreation, utility corridors, and mining. The portion of the study area under BLM jurisdiction is subject to the RMP. The RMP Management Objective and Directions applicable for this action are Objective RW-1, Management Directions RW-1-e and RW-1-h, which provide for ACECs being ROW avoidance areas and lands available at discretion of the agency for ROWs under FLPMA, respectively.

BLM Sunrise Management Area (SMA) Interim Management Plan and Environmental Assessment

The 2000 BLM Sunrise Management Area Interim Management Plan was prepared for portions of the Sunrise Mountain Special Recreation Management Area (SRMA) and Rainbow Gardens ACEC. The interim management plan provides management guidelines for 21,578 of the 37,620 acres within the SMA. These guidelines are consistent with the Las Vegas RMP (BLM 1998), Las Vegas Bearpoppy Habitat Management Plan and Environmental Assessment (BLM 1998), and multiple use principles. The plan is interdisciplinary with a goal of providing recreation opportunities and protecting biological, geological, hydrological, and cultural resources.

Regional Plans

Southern Nevada Regional Policy Plan

The Southern Nevada Regional Planning Coalition (SNRPC) is comprised of elected officials from Las Vegas, North Las Vegas, Henderson, Boulder City, Clark County, and the Clark County School District. The SNRPC has developed a regional plan that promotes the efficient use of land within existing urban areas, allows for the conversion of rural lands to other uses in a well-planned fashion, and promotes sustainable growth.

The legislation includes a conformity process through which regional planning is coordinated with local planning efforts, and directs the SNRPC to address “projects of regional significance” including transmission lines of 60kV or greater that traverse more than one jurisdiction. The SNRPC adopted the Southern Nevada Regional Policy Plan in 2001 to coordinate important decisions about regional land use, transportation, public facilities, air quality, water quality, and open spaces.

Clark County Regional Flood Control District Master Plan

The Clark County Regional Flood Control District 2002 Master Plan Update serves as a planning tool for design, construction, and implementation of the flood control system in the Las Vegas Valley. The study area for the Las Vegas Valley Master Plan Update is divided into nine hydrographic planning areas or watersheds for implementation of the flood control plan. The plan was developed using the ultimate condition as a basis for analysis, which assumes the full “build out” condition has been reached and all available land within the Las Vegas Valley has been fully developed. The ultimate condition is used in conjunction with the 100-year flood frequency flood event to develop hydrologic models that establish peak flow rates and flow volumes for drainage corridors. The peak flow rates and volumes are then used to design and size the flood control facilities. The 2002 Master Plan Update has been subject to a number of amendments and revisions as more detailed analysis has been completed.

Local Plans

Clark County Comprehensive Plan

The Clark County Comprehensive Plan provides a long-term general land use policy plan for unincorporated portions of Clark County. The town advisory boards of unincorporated areas of Clark County prepare land use plans that are incorporated into the Clark County Comprehensive Plan. Sunrise Manor and Whitney have both adopted land use plans.

City of Henderson Comprehensive Plan

The City of Henderson Comprehensive Plan establishes goals and policies regarding city planning and management, land use, public facilities and services, transportation, residential neighborhood design, and environmental quality.

Clark County Multiple Species Habitat Conservation Plan (MSHCP)

The Clark County MSHCP was prepared by several jurisdictions and federal, state, and local regulatory entities to allow for continued development within Clark County in exchange for conservation programs to benefit species that are currently unlisted or that may become listed in the near future without implementation of conservation measures. The MSHCP supports the USFWS issuance of incidental take permits pursuant to section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended (Act) for 79 species on no more than 145,000 acres of non-federal land potentially available for development in Clark County. In the MSHCP, the conservation management category for ACEC’s is less-intensively managed areas (LIMA).

Other Planned Land Uses

Clark County School District

The Clark County School District (CCSD) is currently building the East Career and Technical Academy on 30 acres at the southeast corner of Hollywood Boulevard and Vegas Valley Drive. The CCSD is also considering building a school on a parcel near Calico Ridge south of the Las Vegas Wash. The CCSD Service Standards Matrix indicates that schools should have a 300-foot separation from power lines.

Clean Water Coalition

The Clean Water Coalition (CWC) is comprised of the three agencies currently responsible for wastewater treatment in the Las Vegas Valley: the City of Las Vegas, the City of Henderson, and the Clark County Water Reclamation District. The CWC proposes to implement the Systems Conveyance and Operations Program (SCOP), which includes optimization of the treatment

plants, increased treatment, and a pipeline to discharge the effluent into Lake Mead. Construction of the SCOP has been initiated.

3.2.6 Parks, Recreation, and Preservation Areas

The study area provides multiple recreational activities. The surrounding mountain and desert areas provide open space for off-highway vehicle (OHV) activities, mountain biking, sightseeing, rock collecting, hunting, hiking, nature observation, and horseback riding. These activities primarily occur on lands managed by BLM and Reclamation. Recreational use in the area historically has been dispersed and occurred at low to moderate levels. However, recreational use of the area has increased with the growth of the Las Vegas Valley population.

BLM Area of Critical Environmental Concern (ACEC)

An ACEC is public land with special management guidelines to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. There are two ACECs within the study area Rainbow Gardens and River Mountains (Figure 3.2-1). The Rainbow Gardens ACEC encompasses 37,620 acres and contains geological, scientific, scenic, cultural, and sensitive plant values. The River Mountains ACEC encompasses 5,617 acres and contains desert bighorn sheep habitat as well as being a scenic viewshed for Henderson and Boulder City. Both ACECs are designated as right-of-way avoidance areas except within established utility corridors.

Sunrise Management Area

The SMA includes the SRMA and Rainbow Gardens ACEC. The SMA management goals are to provide recreational opportunities and to protect biological, geological, hydrological, and cultural resource values (BLM 2000). The SMA is dominated by Frenchman Mountain. The Rainbow Gardens portion of Frenchman Mountain was designated as an ACEC for the unique geologic features, including exposed rock strata, tilting and other fault formations, and gypsum-bearing soils.

Mountain biking and OHV use are the primary recreational activities in the area. OHV use is limited to designated roads and trails. Other recreational opportunities in the area include sightseeing, rock collecting, hunting, hiking, wildlife viewing, and horseback riding. Visitation occurs year-round, but the use and volume of visitors vary seasonally. Primary access to the SMA from the south is via Kodachrome Road, Rainbow Gardens Road, and Lava Butte Road. These roads are designed for low to moderate use.

Clark County Parks & Recreation Department

The Clark County Wetlands Park is located within the study area. The Wetlands Park is an extensive special-use regional park located along the Las Vegas Wash that is under the jurisdiction of Reclamation and leased to Clark County for park purposes. Opportunities consist of protecting and enhancing wetlands for wildlife habitat, environmental education, and recreation. The Wetlands Park Master Plan includes a system of hiking, equestrian, and bicycle trails, wildlife viewing areas, and a nature center. The trails will eventually connect the Wetlands Park to the River Mountains Loop Trail and to the overall trail system for the Valley.

There is one existing (Sunrise Mountain) and two planned (Wells and Magic Way) Clark County Wetlands Park trailheads in the study area (Figure 3.2-1). Two additional County parks, Horseman's Park and Dog Fancier's Park, are within the study area (Figure 3.2-1).

City of Henderson Parks and Recreation Department

The City of Henderson Parks and Recreation Department manages the Henderson Bird Viewing Preserve located south of the Las Vegas Wash in the central portion of the study area. The Preserve overlooks the WRF evaporating ponds, and supports migratory waterfowl as well as numerous resident desert birds. Plans for the Bird Viewing Preserve include enhancement of the existing visitor's center with classrooms, meeting areas, educational displays, bird-viewing facilities, restrooms and parking areas.

Henderson has also identified approximately 2,350 acres of land that warrant consideration as open space. Most of these lands have no formal protection and are subject to disposal or development, while other lands would require extensive restoration to achieve a natural appearance. Areas within the study area that could be considered as open space include:

Lake Las Vegas Wetland Park – Consists of 24.9 acres with public access at the mouth of Lake Las Vegas above Lake Las Vegas Parkway. Interpretive pathways and wetland restoration are planned adjacent to the Clark County Wetlands Park.

Lake Las Vegas Conservation Easement – Located at Lake Las Vegas. Conservation easement dedicated to City in an effort to protect adjacent hillsides. No public access as land remains private.

Henderson Landfill – The landfill may be redeveloped to provide a future recreational opportunity for the City. The City has explored the feasibility of a golf course at the site and preliminary plans have been developed. The site may also provide access to the Wetlands Park, and trails are planned around the perimeter of the golf course site and adjacent to the C1 Channel.

Trails

Federal Trails

A portion of the Old Spanish National Historic Trail is located in the study area (Figure 3.2-1). The trail is considered a trail of national significance linked to exploration, migration/settlement, and trade/commerce as related to population expansion of the western United States in the latter half of the 19th century. The BLM and the National Park Service jointly administer this trail, and a Comprehensive Management Plan is currently being prepared for the Old Spanish National Historic Trail.

Regional/Local Trails

A Primary Trail System Plan has been cooperatively developed through the Southern Nevada Regional Planning Coalition, and includes an extensive network of urban trails in Las Vegas, North Las Vegas, Henderson, and unincorporated Clark County. The trail system would also provide access to open space on federal lands in the deserts, mountains, foothills, lakes, and riparian areas that surround the Las Vegas Valley.

The River Mountains Trail Partnership is an association of public agencies, community groups, businesses, and individuals committed to the development of a 35-mile trail around the River Mountains. The River Mountains Loop Trail would encircle the River Mountains and connect the Lake Mead National Recreation Area to Hoover Dam, Boulder City, Henderson, and the rest of the Las Vegas Valley. The Trail is located in the southern and eastern portions of the study area (Figure 3.2-1).

The Clark County Department of Public Works is responsible for the design, engineering, and construction of off-street trails, including the proposed Flamingo Arroyo Trail within the study area. The Flamingo Arroyo Trail will traverse approximately four miles of the Flamingo Wash and Las Vegas Wash, and will ultimately connect University of Las Vegas (UNLV) and surrounding areas with the Clark County Wetlands Park and the Sunrise Management Area.

Golf Courses

Seven golf courses occur within the study area:

- Stallion Mountain Country Club located at 5500 East Flamingo Road in Las Vegas. This 18-hole course is private. A portion of the course is currently being developed to allow residential uses.
- Royal Links Golf Club located at 5995 East Vegas Valley in Las Vegas. This 18-hole course is public. Currently, the potential exists to rezone the site to allow residential uses.
- Desert Rose Golf Course located at 5483 Clubhouse Drive in Las Vegas. This 18-hole course is public.
- Tuscany Golf Club located at 901 Olivia Parkway in Henderson. This 18-hole course is public.
- Reflection Bay Golf Club is located on the Lake Las Vegas Resort. This 18-hole course is public.
- The Falls Golf Club is located on the Lake Las Vegas Resort. This 18-hole course is public.
- The SouthShore Golf Club is located on the Lake Las Vegas Resort. This 18-hole course is private.

3.3 VISUAL RESOURCES

3.3.1 Introduction and Regulatory Setting

Visual resources were identified within the project area up to a distance of three miles. The visual resource inventory consisted of a scenic quality (or visual integrity) evaluation, a viewer sensitivity analysis, and an inventory of the regulatory framework for jurisdictions crossed by the project boundary. The BLM, Clark County, and City of Henderson have specific management laws, ordinances, regulations and standards for the management of visual resources on lands under their jurisdiction. The BLM uses Visual Resource Management Classes as defined in Manual H-8410-1 (BLM 1986) and detailed for the project area in the Las Vegas Resource Management Plan and Sunrise Management Area Interim Management Plan and Environmental Assessment. The Clark County Comprehensive Plan, Sunrise Manor Land Use Plan and Whitney Land Use Plan all contain visual resource management goals and objectives. The SNRPC Regional Open Space Plan also includes scenic and aesthetic recommendations. The City of Henderson adopted a Comprehensive Plan in 2006 detailing utility corridors and visual resource management in the city.

3.3.2 Inventory Methods

The study area for the project was determined based on the two primary project components: the 500kV transmission line and the 230kV transmission lines. Each have differing potential for visual impacts based on the presence of existing lines, the scale of the proposed structures, the potential for contrast and dominance in the landscape, and the viewing context.

For the alternative 500kV transmission line corridors, an area within 3-miles of the centerline (a 6-mile wide corridor) was inventoried for scenic quality and viewer sensitivity. The 500kV corridors are primarily located in a relatively undeveloped, open landscape. The 230kV corridors

traverse a more urbanized landscape where typical views are closer than in undeveloped, open landscapes. Therefore, an area within 1.5-miles of the 230kV transmission lines (3-mile wide corridor) was inventoried.

The study area contains lands under the jurisdiction of the BLM, Reclamation, Clark County, City of Henderson, and private landowners as well as small areas managed by the City of Las Vegas. Reclamation, the State of Nevada, Clark County, and the City of Henderson do not have established methodologies for the assessment of visual resources. Because a significant portion of the study area includes federal lands, a visual resource inventory was conducted using the principles established by the BLM Visual Resources Management System (VRM). The methodology was modified to accommodate urban landscapes where applicable (BLM 1986, 1986a). An informal application of the BLM VRM System and the modified methodology for urban landscapes was uniformly applied to all lands within the study area, including BLM, Reclamation, and other public and private lands. This was done for consistency in the visual analysis for the Sunrise Tap Transmission Line Project alone and does not constitute an adoption of BLM VRM methodology by Reclamation.

The visual resources inventory consisted of a review of existing mapping and aerial photography, landscape setting and character evaluation, a scenic quality/visual integrity analysis, Key Observation Point (KOP) establishment and visual sensitivity analysis, a review of the regulatory setting pertaining to agency management of visual resources, and visibility threshold/distance zone establishment. Field investigation was conducted during June and November of 2007 for the study area for the purposes of evaluating scenic quality/visual integrity, agency consultation, visibility and visual sensitivity analysis, and KOP establishment.

Landscape Character and Scenic Quality/Visual Integrity

The scenic values of the study corridor were documented using scenic quality classes from the VRM system. Because urban and developed lands are not addressed in this system, urban areas were evaluated using a modified version of the scenic quality system which was specifically developed for and is unique to this project. This modified system is referred to as the “visual integrity system.” Visual integrity is a variation of scenic quality, and is a measure of developed area scenic values based on the degree to which the area is perceived to be “complete” or unified. Criteria include perception-based factors such as sense of neighborhood and place coupled with degrees of modification, and how well the area blends in with the surrounding landscape. The visual integrity system was applied only to non-federal lands.

In both naturally dominated landscapes and development dominated landscapes, scenery is rated Class A (Unique), Class B (Above Average), or Class C (Common) based on scenic quality and visual integrity rating criteria (Tables 3.3-1 and 3.3-2). The combination of ratings for landform, vegetation, color, architectural features, etc., determined the scenic quality or visual integrity Class. Table 3.3-3 provides a definition of scenic quality and visual integrity classes.

Table 3.3-1 Scenic Quality Rating Criteria

<p>Landform - Topography becomes more interesting as it gets steeper, more massive, or more severely or universally sculptured. Outstanding landforms may be monumental, such as in the Grand Canyon in Arizona or the Rocky Mountains of the Western United States. Alternatively, landforms may be intricate and subtle such as certain badlands, pinnacles, arches, and other formations.</p>		
<p><i>High Rating For:</i> High vertical relief as expressed in prominent cliffs, spires, or massive rock outcrops; or severe surface variation or highly eroded formations including major badlands or dune systems; <u>or</u> detail features dominant and exceptionally striking and intriguing such as glaciers.</p>	<p><i>Medium Rating For:</i> Steep canyons, mesas, buttes, cinder cones, and drumlins; <u>or</u> interesting erosional patterns or variety in size and shape of landforms; <u>or</u> detail features which are interesting though not dominant or exceptional.</p>	<p><i>Lowest Rating For:</i> Low rolling hills, foothills, <u>or</u> flat valley bottoms; <u>or</u> few or no interesting landscape features.</p>
<p>Vegetation - Primary consideration is given to the variety of patterns, forms and textures created by plant life. Short-lived displays should be considered when they are known to be recurring or spectacular such as the color change from green to red-orange to gold displayed by contiguous groves of western aspen trees or eastern maple trees. Smaller scale vegetation features may add striking and intriguing detail to the landscape.</p>		
<p><i>High Rating For:</i> A variety of vegetative types as expressed in interesting forms, textures, and patterns.</p>	<p><i>Medium Rating For:</i> Some variety of vegetation, but only one or two major types.</p>	<p><i>Lowest Rating For:</i> Little or no variety or contrast in vegetation</p>
<p>Water - Water can add movement, serenity, and strong lighting contrasts to a scene. The degree to which water features have the capacity to unify, diversify, or dominate the scene is the primary consideration.</p>		
<p><i>High Rating For:</i> Clear and clean appearing, still or cascading white water, any of which are a dominant factor in the landscape.</p>	<p><i>Medium Rating For:</i> Flowing, or still, but not dominant in the landscape.</p>	<p><i>Lowest Rating For:</i> Absent, or present, but not noticeable.</p>
<p>Color - Overall colors are observed for the basic components of the landscape such as soil, rocks, and vegetation as they appear during seasons or periods of high use. Key factors to use when rating "color" are variety, contrast, and harmony.</p>		
<p><i>High Rating For:</i> Rich color combinations, variety or vivid color; <u>or</u> pleasing contrasts in the soil, rock, vegetation, water or snowfields.</p>	<p><i>Medium Rating For:</i> Some intensity or variety in colors and contrast of soil, rock, and vegetation, but not a dominant scenic element.</p>	<p><i>Lowest Rating For:</i> Subtle color variations, contrast, or interest; generally mute tones.</p>

<p>Adjacent Scenery Influence - What is under consideration is the degree to which scenery outside the unit being rated enhances the overall impression of the scenery within the unit. The distance over which adjacent scenery will influence a unit will normally range from <i>zero</i> to <i>five</i> miles, depending upon the relief of the topography, upon vegetation cover, upon sun angles, and viewer orientation. This component is generally applied to units that would normally rate very low in score, but the influence of the adjacent unit enhances the visual quality thereby raising the rating score.</p>		
<p><i>High Rating For:</i> Adjacent scenery greatly enhances visual quality.</p>	<p><i>Medium Rating For:</i> Adjacent scenery moderately enhances overall visual quality.</p>	<p><i>Lowest Rating For:</i> Adjacent scenery has little or no influence on overall visual quality.</p>
<p>Scarcity - This component provides an opportunity to elevate the importance of one or of all scenic features within one physiographic region that appear to be unique or relatively rare within the surroundings.</p>		
<p><i>High Rating For:</i> One of a kind; <u>or</u> unusually memorable, <u>or</u> very rare within region. Consistent chance for exceptional wildlife or wildflower viewing, etc.</p>	<p><i>Medium Rating For:</i> Distinctive, though somewhat similar to others within the region.</p>	<p><i>Lowest Rating For:</i> Interesting within its setting, but fairly common within the region.</p>
<p>Intactness - What is recorded for this component is evidence of discordant elements or deviations from the existing landscape character thereby altering, diminishing or minimizing the indigenous aesthetic appeal for which the said landscape would primarily have been valued as a scenic resource. This component is also used to describe the condition of the ecosystem.</p>		
<p><i>High Rating For:</i> Entire character not compromised by external intrusions.</p>	<p><i>Medium Rating For:</i> Some deviations from existing character.</p>	<p><i>Lowest Rating For:</i> Many discordant elements present. Aesthetic appeal is compromised</p>
<p>Cultural Modifications - Of primary concern are the impacts of man-made changes on the visual quality of the characteristic landscape. Cultural modifications to landform, water, and vegetation as well as the addition of structures to the landscape may all detract from the scenery by presenting negative intrusions to the viewer. Conversely, these additions or modifications to the landscape might actually complement or improve the scenic quality of a unit.</p>		
<p><i>High Rating For:</i> Modifications add favorably to visual variety while promoting visual harmony.</p>	<p><i>Medium Rating For:</i> Modifications add little or no visual variety to the area, and introduce few discordant elements.</p>	<p><i>Lowest Rating For:</i> Modifications add variety but are very discordant and promote strong disharmony.</p>
<p>Ephemeral and Non-Visual Conditions - This component considers short-lived but recurrent visual effects such as wildlife sightings and non - visual effects such as the sound of running water which are experientially related to the landscape being viewed.</p>		
<p><i>High Rating For:</i> Frequent wildlife sightings, many natural sounds present.</p>	<p><i>Medium Rating For:</i> Occasional wildlife sighting and natural sounds present.</p>	<p><i>Lowest Rating For:</i> Both wildlife and natural sounds are not present. Some distant urban noise.</p>

Table 3.3-2 Visual Integrity Rating Criteria

<p><i>Landscape/Development Pattern</i> - An interrelationship of land uses and their typical visual appearance is the primary focus. The secondary focus of landscape pattern is the spatial relationships between structural and functional elements of the land. Any type of landscape at any scale can be described as a mosaic: a background of matrix and patches connected by corridors. For instance, a matrix can be uniform to fragmented, continuous to perforated, and aggregated to dispersed. Patches can vary from large to small, elongated to round, and convoluted to smooth. Corridors vary from wide to narrow, and meandering to straight. The edges that separate these spatial elements also vary widely in shape and dimension.</p>		
<p><i>High Rating For:</i> Excellent arrangement of forms, either natural or manmade, that compliment each other. Development patterns are interesting and cohesive, creating distinctive areas or neighborhoods.</p>	<p><i>Medium Rating For:</i> Some spatial harmony exists. Development patterns provide some interest. Neighborhoods are evident, but not notably distinctive or cohesive.</p>	<p><i>Lowest Rating For:</i> Many discordant elements are present. Development patterns are chaotic, lacking differentiation of neighborhoods or distinct areas.</p>
<p><i>Vegetation</i> - Primary consideration is given to the variety of patterns, forms and textures created by plant life. Short - lived displays should be considered when they are known to be recurring or spectacular such as the color change from green to red-orange to gold displayed by contiguous groves of western aspen trees or eastern maple trees. Smaller scale vegetation features may add striking and intriguing detail to the landscape.</p>		
<p><i>High Rating For:</i> A variety of vegetative types as expressed in interesting forms, texture, and patterns.</p>	<p><i>Medium Rating For:</i> Some variety of vegetation, but generally lacking in interesting forms, texture, and patterns.</p>	<p><i>Lowest Rating For:</i> Little or no variety or contrast in vegetation.</p>
<p><i>Water</i> - Water can add movement, serenity, and strong lighting contrasts to a scene. The degree to which water features have the capacity to unify, diversify, or dominate the scene is the primary consideration.</p>		
<p><i>High Rating For:</i> Clear and clean appearing, still or cascading white water, any of which are a dominant factor in the landscape.</p>	<p><i>Medium Rating For:</i> Flowing, or still, but not dominant in the landscape.</p>	<p><i>Lowest Rating For:</i> Absent, or present, but not noticeable</p>
<p><i>Color</i> - Overall colors are observed for the basic components of the landscape such as soil, rocks, and vegetation, and for architectural components, such as buildings, signs, and roadways. Key factors to use when rating “color” are variety, contrast, and harmony.</p>		
<p><i>High Rating For:</i> Rich color combinations in land uses and architectural elements, variety or vivid color; or pleasing contrasts in the soils, rock, landscaping, roof and building colors, signs, and roadways.</p>	<p><i>Medium Rating For:</i> Some variety of color in land uses and architectural elements, contrasts in the soils, rock, landscaping, roof</p>	<p><i>Lowest Rating For:</i> Discordant color contrasts in the soils, rock, landscaping, roof and building colors, signs, and roadways. Colors of land uses and</p>

Color combinations and patterns are harmonious, with pleasing repetitions.	and building colors, signs, and roadways are neither notably pleasing or discordant.	architectural elements may be chaotic and highly contrasting.
Adjacent Scenery Influence - What is under consideration is the degree to which scenery outside the unit being rated enhances the overall impression of the scenery within the unit. The distance over which adjacent scenery will influence a unit will normally range from <i>zero to five miles</i> , depending upon the relief of the topography, upon vegetation cover, upon sun angles, and viewer orientation. This component is generally applied to units that would normally rate very low in score, but the influence of the adjacent unit enhances the visual quality thereby raising the rating score.		
<i>High Rating For:</i> Adjacent scenery greatly enhances visual quality.	<i>Medium Rating For:</i> Adjacent scenery moderately enhances overall visual quality.	<i>Lowest Rating For:</i> Adjacent scenery has little or no influence on over all visual quality.
Scarcity - This component provides an opportunity to elevate the importance of one or of all visual integrity features within one physiographic region that appear to be unique or relatively rare within the surroundings.		
<i>High Rating For:</i> One of a kind; <u>or</u> unusually memorable, <u>or</u> very rare within region.	<i>Medium Rating For:</i> Distinctive, though somewhat similar to other areas or neighborhoods within the region.	<i>Lowest Rating For:</i> Interesting within its setting, but fairly common within the region.
Intactness - What is recorded for this component is evidence of discordant elements or deviations from the existing landscape or neighborhood character thereby altering, diminishing or minimizing the aesthetic appeal for which the said landscape or neighborhood would primarily have been valued as a scenic resource.		
<i>High Rating For:</i> No deviations to the existing character or the landscape or neighborhood are apparent.	<i>Medium Rating For:</i> Some deviations from the existing character or the landscape or neighborhood are apparent.	<i>Lowest Rating For:</i> Many discordant elements present. Aesthetic appeal of the landscape or neighborhood is heavily compromised.
Architectural Features - Architectural elements describe the form, structure, and interrelationships among the building - block elements of the system. The condition of the building system is also considered.		
<i>High Rating For:</i> Architecture, landscaping, development, and land uses add favorably to visual variety while promoting visual harmony.	<i>Medium Rating For:</i> Land uses and developed areas add little visual variety to the area, and introduce some	<i>Lowest Rating For:</i> Land uses and developed areas add no visual variety, are discordant, or promote strong disharmony.

	discordant elements.	
<i>Ephemeral and Non-Visual Conditions</i> - This component considers short - lived but recurrent visual effects, e.g., intense human activity centers, and non - visual effects such as the sound of running water which are experientially related to the landscape being viewed.		
<i>High Rating For:</i> Sights and sounds of the community or area add to the character of the area.	<i>Medium Rating For:</i> Sights and sounds somewhat detract from the character of the area.	<i>Lowest Rating For:</i> Sights and sounds detract strongly and promote disharmony.

Table 3.3-3 Scenic Quality / Visual Integrity Definitions

Scenic Quality	Visual Integrity
Class A or Distinctive - Outstanding areas where characteristic features of landform, rock, water, and vegetation are distinctive or unique in the context of the surrounding areas. These features exhibit considerable variety in form, line, color, and texture and have strong positive attributes of unity and intactness.	Class A or Unique / Cohesive -Developed areas where the landscape appears intact, interesting, and cohesive. The characteristic elements of line, form, color, and texture hold the developed features and landscape together into distinctive areas, landscapes, or neighborhoods. Colors and textures are often seen repeated in these landscapes. Developments and land uses do not contrast with each other or with the landscape.
Class B or Above Average - Above average areas in which features provide variety in form, line, color, and texture. And although the landscape elements may not be rare in the region, they provide sufficient visual diversity to be considered moderately distinctive. These features exhibit more common variety in form, line, color, texture, and have positive, yet more common attributes of unity and intactness.	Class B or Above Average - Developed areas where the landscape is less unique, interesting, and cohesive. Patterns of land use and materials used in structures are varied and different colors. The sense of a cohesive place or neighborhood is not as strong in these landscapes. Colors and textures are not often seen repeated in these areas.
Class C or Common - Common to minimal areas are those where characteristic features have moderate to little variety in form, line, color, and texture in relation to the surrounding region.	Class C or Common areas that appear heavily altered, do not form a sense of place or neighborhood, and are not visually cohesive. The elements of line, form, color, and texture are not often repeated in a cohesive manner. Developments and land uses are diverse and contrast with each other and with the landscape.

Visual Sensitivity

Viewer sensitivity was determined by estimating overall use levels, user attitudes towards change in the landscape, and duration of views of key areas within the study corridors. Use levels may be high, for example, along an interstate highway, and low along a local street. Similarly, a

neighborhood park would be expected to have lower use levels than a regional park that serves the broader community and has amenities such as hiking trails, extensive natural and wildlife areas, and other features. Visual sensitivity criteria are shown in Table 3.3-4. Final visual sensitivity is derived from the combination of user attitude, view duration, and use volume (Tables 3.3-4 and 3.3-5).

Use levels for travel corridors were derived primarily from the most recent NDOT Average Annual Daily Traffic data (NDOT 2006). Because there are many highways, arterial roads, collector roads and local streets in the study area, focus was placed on roads designated by the NDOT roadway functional classifications as Principal Arterials, Minor Arterials and Urban Collectors. Other principal local roads primarily serving residential areas adjacent to the project alternatives were also considered.

Table 3.3-4 Visual Sensitivity Criteria

Criteria	Criteria Intensity		
	High	Moderate	Low
Use Volume	High level of use; many occupants, visitors or travelers	Moderate level of use	Low level of use; relatively few occupants, visitors or travelers
User Attitude	High expectations for maintaining the visual landscape. Relatively natural or architecturally-styled areas where the visual condition is highly regarded or sought after	Users are concerned with landscape conditions, but not the primary focus of their experiences	Low expectations for maintaining the visual landscape. Generally commercial or industrial areas where human caused modifications already exist
Duration of View	Long, fixed or continuous views.	Intermediate views (i.e. open highway views)	Short, brief or intermittent views (i.e. highway views in rolling landscapes)

Table 3.3-5 Visual Sensitivity Matrix

User Attitude	Duration of View	Use Volume	Visual Sensitivity Level
High	Long	High	High
High	Long	Moderate	High
High	Moderate	Moderate	High
High	Moderate	Low	High
High	Long	Low	High
Low	Short	High	Moderate
Moderate	Moderate	High	Moderate
Moderate	Moderate	Moderate	Moderate
Moderate	Long	Moderate	Moderate
Low	Moderate	Moderate	Moderate
Moderate	Short	Low	Low
Low	Short	Low	Low

¹ Visual sensitivity levels were determined only for those combinations of user attitude, duration of view, and use volume which would be expected to occur for the Project.

Distance Zones

The distance thresholds or zones that are established in the VRM methodology (BLM 1986) fall into the following categories:

- Foreground – The limit of a viewed area in which details are perceived and obvious. Textural and other aesthetic qualities of vegetation are normally perceived within this zone (0 to ¼ - ½ mile).
- Middleground – The zone in which details of foliage and fine textures cease to be perceptible. Vegetative patterns begin to appear as outlines or patterns (¼ - ½ to 3 - 5 miles).
- Background – That portion of the landscape where texture and color are weak and landforms become the most dominant element (3 - 5 to 15 miles).
- Seldom Seen – Those areas of the landscape where topographic relief or vegetation screen viewpoints or when viewing distances are beyond 15 miles.

For this project, a review of previous studies in similar geographical, topographical, and environmental settings was performed, and relevant visibility thresholds were established for project components (Jones & Jones 1976). Visibility is expected to be influenced to a greater degree than other projects by smog and pollution, and the impact models adjusted accordingly. The urban setting of the project was also taken into account during the establishment of the visibility thresholds.

Taking into account previous visual studies and existing setting of the proposed project, visibility thresholds were determined. Visibility zones were determined for both the 230kV and the 500kV transmission line corridors. Distance zones were determined primarily based on the development context and size of the project components.

3.3.3 Inventory Results

Landscape Setting

The project is located in the Salton Trough Section of the Basin and Range physiographic province. Broad basins, valleys, and old lakebeds make up most of the area, but widely spaced mountains trending north to south occur throughout the area. Isolated, short mountain ranges are separated by a desert plain (Fenneman 1931). The study area is a mix of urbanized and natural landscapes. In its natural state, the region is dominated by a creosote-brush basin surrounded by sparsely vegetated, scattered, sometimes steep and dramatic mountains. Development in the form of roads, highways, utility corridors (electrical, gas, water), communication towers, commercial areas, residences and industrial facilities dominate a significant portion of the project area. The northern and eastern portions of the study area are dominated by undeveloped foothill, mountain and riparian landscapes. The Las Vegas Wash and Wetlands Park area is in a seemingly natural state, but is disturbed by invasive and exotic vegetation, historic channeling and damming, and flood restoration activities. Figure 3.3-1 shows existing Visual Resources in the study area.

Figure 3.3-1 Visual Resources
See CD

Residential urban development dominates the southern and western portion of the study area. Commercial and industrial areas dominate the main arterials such as Boulder Highway and Lake Mead Parkway. Significant recreational areas include lands managed by Clark County, BLM, and Reclamation; these include the Sunrise Management Area (Frenchman's Mountain and Rainbow Gardens ACEC), the Las Vegas Wash and Wetlands Park, and the River Mountains ACEC. The Lake Mead National Recreation Area is located to the east of the study area, and is a significant regional recreational resource.

The most valued landscapes in the area in terms of "natural" visual quality and scenery are the Las Vegas Wash, Rainbow Gardens ACEC and Frenchman's Mountain on the northern side of the study area. Wetlands Park and the Las Vegas Wash are visible as a meandering green strip contrasted against the rust, tan and brown colored backdrop. Concern for the preservation of various views has been expressed by Clark County and BLM, as well as various local environmental advocacy groups. Public interest concerning visual aspects of the Wash and other regional natural areas has grown as the intensity of urban development of Las Vegas has accelerated.

Existing high-voltage transmission line infrastructure occurs throughout the study area. The most visually significant existing corridor is located on the eastern side of the Sunrise Management Area and western side of the River Mountains (River Mountains ACEC). The corridor contains three 500kV lines supported by lattice structures of various configurations (Figure 3.3-2). There are also 4 radio towers located on Reclamation lands north of Wetlands Park near the Sunrise Mountain trailhead. The existing 500kV corridor and the radio towers provide contrasting, industrial elements in the landscape in and around the Sunrise Management Area and Wetlands Park that is otherwise in a relatively natural state.



Figure 3.3-2 Existing 500kV Transmission Line Corridor

Scenic Quality and Visual Integrity

Class A

Class A landscapes occur in both developed and natural landscapes in the study area. The landscape in and around Lake Las Vegas, with its golf course, water features, architectural themes, and mountainous backdrop provides some of the most scenic developed areas. The existing 500kV transmission line corridor (Figure 3.3-2) somewhat detracts from the visual integrity of the area, but the golf course and lake focal points coupled with the architectural setting makes this a unique, attractive development.

Unique natural landscapes in the study area also occur in and around the Rainbow Gardens ACEC, where dramatic landforms combine with diverse colors to form a unique landscape. The area is named for its colorful rock strata near the southeastern boundary of the ACEC. Frenchman's Mountain is a rugged, steep ridge that forms a backdrop for greater Las Vegas. Approximately 16.3% of the study area is Class A. Figures 3.3-3 and 3.3-4 present representative photos of Class A landscapes in the study area.

Class B

Class B landscapes in the study area also include both developed and natural landscapes. Above average natural landscapes occur adjacent to the Rainbow Gardens ACEC, Frenchman's Mountain and include the River Mountains on the west side of Lake Mead in the lower elevation hills and along the Las Vegas Wash. The Las Vegas Wash provides views of a greenbelt with contrasting colors and textures set against the rust, brown and tan colored hills and mountains.

Class B developed landscapes typically occur within planned subdivisions with established vegetation (such as street trees), common architectural themes and styles, and adjacent views of Frenchman's Mountain, Sunrise Mountain, and Rainbow Gardens ACEC. Approximately 40.6% of the study area is Class B. Figures 3.3-5 and 3.3-6 present representative photos of Class B landscapes in the study area.

Class C

Class C landscapes occur primarily in developed areas in the Las Vegas valley and in disturbed, semi-natural areas of the surrounding hills. Class C landscapes occur in all industrial, commercial, and mixed use zones, as well as many residential neighborhoods within the study area. Approximately 43.1% of the study area is Class C. Figures 3.3-7 and 3.3-8 present representative photos of Class C landscapes in the study area.



Figure 3.3-3 Class A Scenic Quality Class (Federal Lands)



Figure 3.3-4 Class A Visual Integrity Class (Private Lands)



Figure 3.3-5 Class B Scenic Quality Class (Federal Lands)



Figure 3.3-6 Class B Visual Integrity Class (Urban Private Lands)



Figure 3.3-7 Class C Scenic Quality Class (Federal Lands)



Figure 3.3-8 Class C Visual Integrity Class (Urban Private Lands)

Viewer Sensitivity

Residences, parks and recreation areas, recreation destination routes and travel corridors were inventoried throughout the study area. Identified viewpoints are described below, and the results of the visual sensitivity analysis are described below and summarized in Table 3.3-6.

Table 3.3-6 Visual Sensitivity Analysis Results

Viewpoints	User Attitude	View Duration	Use Volume	Visual Sensitivity
Residences	High	Long	Low	High
Recreation Destination Routes				
Hollywood Boulevard/Telephone Line Road	Moderate-High	Long	Low	High
Lake Mead Parkway (past Lake Las Vegas Parkway)	Moderate-High	Moderate	Low	High
Travel Corridors				
Lake Mead Parkway, Lake Las Vegas Parkway	Low-Moderate	Moderate	High	Moderate
Hollywood Boulevard, Vegas Valley Drive, Sahara Avenue, Desert Inn Boulevard, Tropicana/Broadbent Boulevard, Cabana/Flamingo/Jimmy Durante, Olivia Parkway, Sunset Road/Pabco Road	Low-Moderate	Long	Moderate	Moderate
Parks and Recreation				
Seward Place Park, Lewis Family Park, Maslow Park, Whitney Park, Equestrian Park, Saguaro Park, Haley Hendrix Park	High	Long	Low	High
Desert Inn Park, Horseman's & Dog Fanciers Park, Parkdale Park, Cinnamon Ridge Park, River Mountains Park, Russell Road Sports Complex, Stephanie Lynn Craig Park, Wells Park, White School Park, Whitney Ranch Recreation Site and Pool, Winterwood Park	Low-Moderate	Long	Low	Moderate
Wetlands Park (Viewing Blinds/Shade Structures, Multi-use Trails, Visitors Center, and Pedestrian/Equestrian Trail Heads)	High	Long	Moderate	High
Golf Courses and Country Clubs				
Desert Rose Golf Course	Low-Moderate	Long	Moderate	Moderate

Residences

All residences in the study area are considered high sensitivity. Views of the project area occur primarily from residences located adjacent to the alternatives due to the urban context of the project where buildings often obstruct views and limit visibility to the immediate foreground. Longer viewing distances occur where residences have open views across undeveloped landscapes or where topography allows for a superior viewing position. Proximate views of the project alternatives will occur from the Tuscany, Calico Ridge and Lake Las Vegas developments. Other unobstructed views will occur from “Section 4” residential area, Equestrian Drive, Foothills Drive, Magic Way, west of Wetlands Park, and the Stallion Mountain #2 and River Walk developments.

Residences located in the Calico Ridge, Tuscany, and Lake Las Vegas developments have scenic views of the Las Vegas Wash and Sunrise Management Area to the north. Lake Las Vegas, however, views both of these landscapes and the project area through an existing utility corridor containing three sets of 500kV lattice structures. Residences in the “Section 4” development have expansive views of the Las Vegas Valley and “The Strip” to the northwest.

Parks, Recreation and Trails

Parks and recreation areas were also identified in the study area. These include developed facilities owned and maintained by the City of Henderson, Clark County, and the City of Las Vegas, as well as undeveloped recreational areas under the jurisdiction of the BLM, Reclamation and the NPS. The following parks and recreation facilities, including golf courses, were identified:

Lake Mead National Recreation Area (LMNRA) – This important resource provides visitors with a wide variety of recreational opportunities. Activities within the LMNRA include boating and paddling, fishing, swimming, scuba diving, picnicking, biking, hiking and other activities in the scenic setting of Lake Mead. A small portion of the LMNRA is located within the study area, and no significant viewpoints were identified for inclusion in the sensitivity analysis.

City of Las Vegas (Department of Leisure Services)

- Seward Place Park – Contains playground facilities, walking path, and picnic facilities.

Clark County (Department of Parks and Recreation)

- Clark County Wetlands Park – Developed facilities are concentrated on the south side of the wash within the 130 acre Nature Preserve area. The Nature Preserve includes a visitor’s center and parking, nature preserve, and interpretive and multi-use trails. Additional viewpoints within the park include trail-side shelters, viewing blinds, and a “scenic drive” on the south side of the wash which is presently closed to vehicles. The Wetlands Park Coordinator and park staff report that the “scenic drive” is not expected to open to traffic due to a lack of funding. Other areas of Wetlands Park are primarily devoted to self-directed hiking, biking, and equestrian recreation on the network of unpaved trails. The newly built Sunrise Mountain trailhead is located on the northwest side of the park. The trailhead serves as a staging area for ATV users, mountain bikers, hikers, and others accessing Wetlands Park, Sunrise Management Area, and other public lands.
- Desert Inn (Dog) Park – This park is located in a residential neighborhood south of Desert Inn Boulevard. Amenities include picnic areas and restrooms.

- Desert Rose Golf Course – This is a public course located at Sahara Avenue and Nellis Boulevard on the northwest side of the study area west of the Sunrise Substation.
- Horseman’s Park/Dog Fancier’s Park – This park is located south of Flamingo Road and east of Jimmy Durante Boulevard. It contains a picnic area in the setting devoted to animal training and play that also includes arenas, stalls, pens and runs.
- Lewis Family Park – Located on American Beauty Way just west of Hollywood Boulevard, the park contains basketball courts, a fitness course, horseshoe courts, picnic areas, playgrounds, volleyball courts, and a walking course.
- Maslow Park – Located southwest of the Boulder Highway-Nellis Boulevard intersection in a residential area, the park contains ball fields, picnic areas, playground facilities, a swimming pool, and walking paths.
- Parkdale Park – This is a residential neighborhood park containing basketball courts, picnic areas, playground facilities, and a swimming pool near Desert Inn Road and Mountain Vista Street
- Whitney Park – Located in the East Las Vegas area of Whitney near the Tropicana-Boulder Highway intersection, the park contains basketball, tennis, and volleyball courts, picnic facilities, playgrounds, a swimming pool, and walking trails.
- Winterwood Park – Contains mixed-use ball fields, a fitness course, picnic areas, playground facilities, tennis courts, and a walking course in an area just north of Sahara Avenue on Winterwood Boulevard.

City of Henderson (Department of Parks and Recreation)

- Equestrian Park – This park is located southwest of the Equestrian Substation at the corner of Equestrian Drive and Magic Way. It contains a multi-purpose field, hiking trails and equestrian facilities, and has views of the 230kV alternative and existing 500kV transmission lines to the east and northeast.
- Haley Hendricks Park – This park is located at the southwest corner of the “Section 4” tract, and contains barbeque grills, picnic tables and shelters, horseshoe and volleyball courts, multi-purpose fields and ball fields, a skateboard park, a walking course, and water-play/playground facilities.
- River Mountains Park – This park is located in the southeast side of the study area south of Equestrian Dr. and west of Appaloosa Road, and contains barbeque grills, picnic tables and shelters, horseshoe, tennis, volleyball, and basketball courts, multi-purpose and ball fields, and playground facilities.
- Russell Road Sports Complex – Located south of Russell Road and east of Stephanie Street, this park contains multi-purpose fields and ball fields, picnic shelters and tables, barbecues, playground facilities, volleyball courts, and horseshoe pits. This park has views of the 230kV alternative to the north.
- Saguaro Park – This park is about 1.2-miles to the north of Equestrian Park on Magic Way, and contains basketball courts, an open grass field, and playground/water play facilities. The park also has views of the 230kV alternative and existing 500kV transmission lines to the east.
- Stephanie Lynn Craig Park – Located approximately a mile west of the Russell Road Sports Complex and south of Russell Road, this park contains ball fields, picnic shelters and tables, and playground facilities.
- Tuscany Park – This park is currently under construction on the north side of Tuscany Subdivision adjacent to the Henderson Landfill.

- Wells Park – Amenities in this park include ball fields, barbeque grills, picnic shelters, basketball and tennis courts, playground facilities, and a swimming pool. It is located near the corner of Moser Drive and Merlayne Drive.
- Whitney Ranch Recreation Site and Pool – Located south of White School Park, the Recreation Center and Pool includes indoor recreation and pool facilities and an outdoor activity pool.
- White School Park – Located south of and adjacent to Stephanie Lynn Craig Park, this park contains multi-purpose and ball fields, picnic tables, and basketball and tennis courts.

Recreational trails of regional importance were also identified in the study area. These include:

- River Mountains Loop Trail – This multi-use trail is the result of a collaborative effort among public agencies and private groups, and is located on the east side of the study area in Henderson and Clark County. The loop trail is currently under construction, but a portion of the completed section is located in the study area. The loop trail connects eastern greater Las Vegas with Lake Mead National Recreation Area, Hoover Dam and Boulder City.
- Flamingo Arroyo Trail – Also incomplete, this Clark County trail is the first segment of the Las Vegas Regional Trail System connecting Wetlands Park and the UNLV campus along Hollywood Boulevard and the Las Vegas Wash in the study area. A portion of the trail between Desert Inn Road and Vegas Valley Drive is not completed in the study area.

Lands in the study area that are managed by the BLM provide a variety of recreational opportunities. Dispersed recreation activities in the form of OHV, equestrian, mountain biking, and fossil hunting occur throughout the area, as well as along established trails and roads. Three main roads/trails serve as access points from the Las Vegas Wash area into the Sunrise Management Area: Kodachrome Road, Rainbow Gardens Road, and Lava Butte Road (Figure 3.3-1). These roads are accessed via Telephone Line Road, which serves as extension of Hollywood Boulevard from the Sunrise Mountain trailhead. Lava Butte Road is the main access route to the Rainbow Gardens area where fossil hunting, OHV use, equestrian activities, and mountain biking are the primary activities (Wandel 2007).

Travel Corridors

Because the study area is highly urbanized, there are many highways, arterials, collector roads and local roads. Sensitivity levels were developed for the following roads in the study area:

- Lake Mead Parkway
- Lake Las Vegas Parkway
- Hollywood Boulevard
- Tropicana Avenue/ Broadbent Boulevard
- Desert Inn Boulevard
- Vegas Valley Drive
- Sahara Avenue
- Cabana Drive/East Flamingo Road/Jimmy Durante Boulevard
- Sunset Road/Pabco Road
- Olivia Parkway (Tuscany)

Lake Mead Parkway serves as a Recreation Destination Route to the Lake Mead National Recreation Area located in the northeast portion of the study area. The highest traffic volumes on Lake Mead Parkway occur generally southeast of Lake Las Vegas Parkway (State of Nevada NDOT 2006). A portion of Hollywood Boulevard/Telephone Line Road also serves as Recreation

Destination Routes. Hollywood Boulevard/Telephone Line Road serves as the entry route to the Sunrise Mountain trailhead, Sunrise Management Area, and the north portion of Wetlands Park. Wetlands Park Lane Recreation Destination Route provides a route to the Wetlands Park Visitor Center.

Key Observation Points

In coordination with BLM staff and Clark County Wetlands Park staff, a total of eight KOPs were identified in the study area (Chapter 4, Figure 4.3-1). KOPs were established for the purpose of identifying and evaluating representative views and to evaluate potential visual impacts associated with the Project. The KOPs are briefly described below:

- KOP #1 – Located at the corner of Coffeerville Creek Drive and S. Hollywood Blvd. looking south from the existing River Walk Subdivision and planned affordable housing development on BLM disposal land. Viewer Sensitivity: High; Visual Integrity: Class C
- KOP #2 – Located at the new Clark County Sunrise Mountain trailhead looking north towards Frenchman’s Mountain and Sunrise Management Area. Viewer Sensitivity: High; Scenic Quality: Class B
- KOP #3 – Located on Lava Butte Road accessing Rainbow Gardens on the north side of Wetlands Park on Bureau of Reclamation land looking east (Appendix A). Viewer Sensitivity: High; Scenic Quality: Class B
- KOP #4 – Located in the Tuscany Hills planned development and golf club in Henderson looking north toward the Sunrise Management Area. Viewer Sensitivity: High; Visual Integrity: Class B
- KOP #5 – Located on the south side of the Las Vegas Wash north of the “Scenic Drive” looking toward the Sunrise Management Area. Viewer Sensitivity: High; Scenic Quality: Class B
- KOP #6 – Located in the “Section 4” tract residential area in Henderson southeast of West Lake Mead Drive. Viewer Sensitivity: High; Visual Integrity: Class C
- KOP #7 – Located on the bridge across the Las Vegas Wash at the east Wetlands Park secondary entrance and trailhead, looking west toward the Sunrise Management Area and upstream on the Las Vegas Wash. Viewer Sensitivity: High; Scenic Quality: Class A and B
- KOP #8 – Located in the Solera at Stallion Mountain “active adult” development in Las Vegas, looking west across the Stallion Mountain Country Club’s golf course toward “The Strip.” Viewer Sensitivity: High; Scenic Quality: Class C.

Table 3.3-7 Key Observation Point Visual Contrast Summary

		Land/Water Body				Vegetation				Structures			
		F	L	C	T	F	L	C	T	F	L	C	T
500kV Alternatives													
KOP 1		W	W	M	W	W	W	W	W	S	S	M	W
KOP 2	Alternatives 1, 3, & 4	W	W	M	W	W	W	W	W	S	S	M	M
KOP 2	Alternative 2	M	W	M	M	W	W	W	W	S	S	M	M
KOP 3	Alternative 1	W	W	M	W	W	W	W	W	S	S	M	M
KOP 3	Alternatives 2 & 3	M	W	W	W	W	W	W	W	S	S	M	M
KOP 3	Alternative 4	W	W	W	W	W	W	W	W	S	S	M	M
KOP 4	Alternative 1	W	W	M	M	W	W	W	W	S	S	M	M
KOP 4	Alternatives 2, 3, & 4	M	M	W	W	W	W	W	W	S	S	M	M
KOP 5	Alternatives 2 & 3	M	M	W	M	W	W	W	W	S	S	M	M
KOP 5	Alternative 4	M	M	W	W	W	W	W	W	S	S	M	M
KOP 7	Alternatives 2, 3, & 4	M	M	W	M	W	W	W	W	S	S	M	M
Sunrise-Equestrian 230kV													
KOP 6		W	W	W	W	W	W	W	W	M	M	W	W
Sunrise-Clark 230kV													
KOP 8		W	W	W	W	W	W	W	W	M	M	W	W

Key: F = Form, L = Line, C = Color, T = Texture, S = Strong Contrast, M = Moderate Contrast, W = Weak Contrast

Distance Zones

Distance zones were established based upon perception thresholds, the scale and nature of the objects being viewed, and the viewing environment. The perception of form, texture, color and line vary as a result of viewing distance. In general, landscape elements tend to become less obvious and detailed at greater distances. Elements of form and line become more dominant than color or texture at longer viewing distances.

This project has two primary components: 230kV transmission lines and a 500kV transmission line. The scale and configuration of the structures and conductors for these project components is somewhat different. For the purposes of this study and in light of the project's urban context, visibility thresholds were established and are presented in Table 3.3-8.

Table 3.3-8 Distance Zones

Visibility Threshold	Project Components	
	230kV Transmission Lines	500kV Transmission Line
Immediate Foreground	0 to 500 feet	0 to 1000 feet
Foreground	500 feet–½ mile	1000 feet–¾ mile
Middleground	½ mile to 1½ mile	¾ mile–3 miles
Background/Seldom Seen	Beyond 1½ mile	Beyond 3 miles

3.4 BIOLOGICAL RESOURCES

3.4.1 Inventory Methodology and Regulatory Framework

The methodology used to develop the biological resources baseline inventory in the project area included consultation with resource agencies, literature review, and field investigations. The distribution of vegetative communities within the project area was determined utilizing data from the Southwest Regional Gap Analysis Project, analysis of 2006 aerial photography from the Clark County GIS Management Office, and field reconnaissance. This data was also utilized as the basis for the assessment of wildlife habitat within the project area. Current information on the occurrence of sensitive species in the project area was obtained from resource agencies including the U.S. Fish and Wildlife Service (USFWS), BLM, Nevada Natural Heritage Program (NNHP), and Nevada Department of Wildlife (NDOW). As a result of several recent projects that have been completed in the project area and the general interest in the Las Vegas Wash, there is a large amount of literature on biological resources within the project area. Protocol surveys were conducted for special status plant and wildlife species within the project area and as detailed in the Summary of Biological Field Investigations for the Sunrise Tap Transmission Line Project (SWCA 2007). In the area of the Las Vegas Wash crossing of the Sunrise-Equestrian (LV#3) 230kV transmission line, the project area was considered a 1 mile corridor (1/2 mile each side of centerline) to accommodate potential modification of the alignment to reduce span length and avoid interference with the Pabco Weir. The Sunrise-Clark (LV #1) 230kV transmission line was not surveyed because it is entirely within a developed urban area with no potential habitat for special status plant and wildlife species. The specific protocols utilized and the areas surveyed are discussed in the appropriate sections below.

A number of federal, state, and local regulations pertain to the protection and management of special status species in the project area. These statutes and regulations are summarized below.

Federal

The Endangered Species Act of 1973 (ESA; 16 U.S.C. Section 1531 et seq.), as amended, provides for the conservation of federally listed plant and animal species and their habitats. The ESA directs federal agencies to conserve listed species, and imposes an affirmative duty on these agencies to ensure that their actions are not likely to jeopardize the existence of a listed species or destroy their habitat.

The Migratory Bird Treaty Act of 1918 (MBTA; 16 U.S.C. 703-711), as amended, protects migratory bird species. The MBTA prohibits hunting, taking, possessing, selling, purchasing, shipping, transporting, or possessing any migratory bird, part, nest, or egg, unless permitted by regulations.

The Bald and Golden Eagle Protection Act of 1940 (BGEPA; 16 U.S.C. 668a-d), as amended, prohibits any form of taking or possession of bald and golden eagles.

BLM Special Status Species Management 6840 establishes policy for the management and conservation of sensitive plant and animal species. Policy 6840 gives the State Director the responsibility of designating BLM sensitive species in consultation with State wildlife agencies and Natural Heritage Programs.

State

The NDOW and the Nevada Division of Forestry have listed endangered and threatened plant and wildlife species in Nevada. Nevada Revised Statutes (NRS) Chapter 503 regards the protection and management of special status wildlife species, while NRS Chapter 527 regards the protection and management of special status plant species, including cacti and yucca species and Christmas trees.

Local

The Clark County MSHCP was prepared by several jurisdictions and federal, state, and local regulatory entities to allow for continued development within Clark County in exchange for conservation programs to benefit species that are currently unlisted or that may become listed in the near future without implementation of conservation measures. The MSHCP supports the USFWS issuance of incidental take permits for 79 species covered by the MSHCP for activities on non-federal properties within Clark County. The MSHCP is intended to maximize prospects for long-term protection for habitats located in Clark County as well as the many species of plants and animals which inhabit those areas and to minimize economic disruption caused by listing of additional species by accomplishing early implementation of the terms of the MSHCP.

3.4.2 Vegetation

Vegetative Communities

The study area is located within the Mojave Basin and Range ecoregion (EPA 2002). The climate is arid, with temperatures that range between 20°F to over 100°F and an average annual precipitation of 4 to 6 inches. The majority of precipitation occurs during the summer monsoon period. Elevations within the study area range from 1,440 feet to 2,280 feet (439 m to 695 m) above mean sea level (msl). The primary geographic features include hilly terrain and ridges in the northern and southeastern portions of the project area and the Las Vegas Wash in the central portion of the area. The remainder of the study area contains flat-gently sloping terrain.

Creosote-bursage scrub is the predominant upland vegetative community in the study area. Creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) are the dominant shrubs in this community and a variety of annual grasses and forbs comprise the herbaceous understory. This community occurs on well-drained soils throughout the study area, except for extremely rocky slopes and washes. Small patches of Mojave desert mixed-scrub, blackbrush scrub, and Salt desert scrub also occur in the study area.

Wetland and riparian communities occur along the Las Vegas Wash. Common wetland plant species within the Las Vegas Wash include cattail (*Typha domingensis*), bulrush (*Scirpus* spp.), pale smartweed (*Polygonum lapathifolium*), common reed (*Phragmites australis*), and yellow nut-sedge (*Cyperus esculentus*) (SWCA 2000b). The riparian community is dominated by tamarisk (*Tamarix ramosissima*), with understory species including honey mesquite (*Prosopis*

glandulosa var. *torreyana*), common reed, arrow weed (*Pluchea sericea*), seep willow (*Baccharis salicifolia*), sandbar willow (*Salix exigua*), Anderson desert thorn (*Lycium andersonii*), rabbit's foot grass (*Polypogon monspeliensis*), and exotics such as perennial whitetop (*Lepidium latifolium*) and giant reed (*Arundo donax*).

The alternative 500kV transmission line corridors primarily cross creosote-bursage scrub and a small area of Mojave mixed-scrub at the eastern end of the routes (Figure 3.4-1). The 230kV transmission line corridors cross primarily urban areas. LV #3 crosses a large contiguous area of creosote-bursage scrub north of the Las Vegas Wash, tamarisk riparian-wetland where it crosses the Las Vegas Wash, and areas of creosote-bursage scrub and riparian wetland south of the Wash (Figure 3.4-1). LV #1 crosses a small area of creosote-bursage scrub east of the Clark Substation. Table 3.4-1 summarizes the length of each habitat type crossed by the Sunrise-Clark (LV #1) and Sunrise-Equestrian (LV #3) 230kV transmission lines and the alternative 500kV transmission line routes.

Table 3.4-1 Habitat Types Crossed by the Transmission Line Routes (linear feet)

Habitat Type	Sunrise-Clark 230kV	Sunrise-Equestrian 230kV	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Urban	25,448	39,398	11,721	10,417	11,721	11,721
Creosote-bursage scrub	2,090	18,263	25,239	25,596	24,323	25,014
Mojave mixed-scrub	0	1,083	2,228	1,013	1,013	1,013
Tamarisk riparian	0	4,839	0	0	0	0

Special Status Plant Species

Based upon a review of the literature, previous studies in the project area, and the Nevada Natural Heritage Program database, it was determined that a total of 9 special status plant species have the potential to occur in Clark County (Table 3.4-2).

Surveys for special status plant species were conducted within the project area in May and June 2006. BLM-qualified botanists conducted the surveys following BLM approved botanical survey protocol. For the purposes of the botanical surveys, the project area included 1) a 600-foot-wide corridor (300 feet either side of centerline) along each of the four 500kV alternatives, 2) a 300-foot-wide corridor (east of centerline only) along the segment of the 500kV line that parallels Hollywood Boulevard, and 3) a 300-foot-wide corridor (150 feet either side of centerline) along non-urbanized portions of the Sunrise-Equestrian 230kV transmission line. Little natural habitat remains on the Sunrise-Clark 230kV line, thus it was not surveyed. The Summary of Biological Field Investigations report (SWCA 2007) identifies the specific corridors that were surveyed.

Botanists performed pedestrian surveys of 100% of the linear corridors from May 30 to June 9, 2006 using belt transects spaced approximately 30 feet apart. All sensitive plant populations located during the surveys were identified, and the locations and number of individuals were recorded using a Geographic Positioning System (GPS) unit. For populations that were less than 10 feet (3 m) in diameter, a point coordinate was recorded using a GPS unit, and the number of individuals recorded. For populations larger than 10 feet (3 m) in diameter, an area (polygon) was recorded using the GPS unit by walking the perimeter of the population and counting all

Figure 3.4-1 Biological Resources
See CD

Table 3.4-2 Special Status Plant Species that Potentially Occur in the Study Area

Common Name	Scientific name	Status ¹	Species Presence ²
Las Vegas bearpoppy	<i>Arctomecon californica</i>	F, B, S, M	Present
White bearpoppy	<i>Arctomecon merriamii</i>	F, S, M	Not present
Threecorner milkvetch	<i>Astragalus geyeri</i> var. <i>triquetrus</i>	F, S, M	Not present
Halfring milkvetch	<i>Astragalus mohavensis</i> var. <i>hemigyris</i>	F, S, M	Not present
Las Vegas catseye	<i>Cryptantha insolita</i>	F, S	Not present
Las Vegas buckwheat	<i>Eriogonium corymbosum</i> var. <i>glutinosum</i>	F, B, S	Not present
Blue diamond cholla	<i>Opuntia whipplei</i> var. <i>multigeniculata</i>	F, B, S, M	Not present
Yellow twotone beardtongue	<i>Penstemon bicolor</i> spp. <i>bicolor</i>	F, S, M	Not present
Rosy twotone beardtongue	<i>Penstemon bicolor</i> spp. <i>roseus</i>	F	Not present

¹ F=Federal Species of Concern; B=BLM Species of Concern; S=State of Nevada special status species protected under Nevada Revised Statutes 527; M=covered by the Clark County MSHCP

² Species presence/absence in the project area as determined by botanical surveys

Table 3.4-3 Number of Las Vegas Bearpoppy Plants by Survey Corridor

	Sunrise-Equestrian Survey Corridor				
	230kV	Alternative 1 500kV	Alternative 2 500kV	Alternative 3 500kV	Alternative 4 500kV
Number of Plants	3	312	2,026	308	302

Noxious Weeds

The United States Department of Agriculture defines a noxious weed as a “species of plant that causes disease or is injurious to crops, livestock or land, and thus is detrimental to agriculture, commerce or public health.” Once an invasive plant is designated as noxious, it is elevated to a status that carries regulatory authority. Nevada regulates the control of noxious weeds through NRS Chapter 555.160-180. Federal agencies are also directed by Invasive Species Executive Order 13112 to expand and coordinate efforts to prevent the introduction and spread of invasive plant species (noxious weeds) and to minimize the economic, ecological, and human health impacts that invasive species may cause.

Two state-regulated noxious weeds, tamarisk (*Tamarix* spp.) and tall whitetop (*Lepidium latifolium*) are known to occur along the Las Vegas Wash (LVWCC 2003). Both of these species were observed in the project area during botanical surveys conducted for the proposed project (SWCA 2007).

3.4.3 Wildlife

Wildlife species found in the study area include those that commonly occur in the Mojave Desert and are adapted to xeric, desert scrub habitats. Wildlife surveys were conducted in the project area between May 17 and June 15, 2006. A total of 41 species and/or signs of species were observed during these surveys. All wildlife species observed within the study area, or identified by indirect

evidence such as tracks, burrows, carcasses, or scat, are provided in the Summary of Biological Field Investigations (SWCA 2007). Birds, raptors, and reptiles comprised the majority of species observed during field investigations, as is typical for diurnal wildlife surveys in the Mojave Desert.

Water quality of the Las Vegas Wash is adequate to support fish; however, the Wash is considered to be poor habitat for most fish species because of the high flow velocities and levels of suspended sediment, unstable channel substrate, and the blockage of fish movements by erosion control structures (United States Bureau of Reclamation and National Park Service 2005). No fish surveys were conducted for the proposed project.

Federally Listed Wildlife Species

A list of species designated as endangered, threatened, or candidate under the ESA was obtained from the USFWS (USFWS 2007). The USFWS lists 15 species within Clark County, Nevada (Table 3.4-4). The bald eagle, which was on the Clark County list, has been de-listed (72 FR 37346) and is not included in Table 3.4-4.

Table 3.4-4 Federally Listed Species in Clark County, Nevada

Common Name	Scientific Name	Status	Suitable Habitat	Occurrence in Project Area
BIRDS				
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	Candidate	Yes	Does not occur ¹
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	Endangered	Yes	Known to occur ²
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	Endangered	Yes	Known to occur ³
REPTILES				
Desert tortoise	<i>Gopherus agassizii</i>	Threatened	Yes	Known to occur ²
AMPHIBIANS				
Relict leopard frog	<i>Rana onca</i>	Candidate	Yes	Does not occur
FISH				
Devil's Hole pupfish	<i>Cyprinodon diabolis</i>	Endangered	No	Does not occur
Pahrump poolfish	<i>Empetrichthys latos</i>	Endangered	No	Does not occur
Humpback chub ⁴	<i>Gila cypha</i>	Endangered	No	Does not occur
Bonytail chub	<i>Gila elegans</i>	Endangered	No	Does not occur
Virgin River chub ⁵	<i>Gila seminude</i>	Endangered	No	Does not occur
Moapa dace	<i>Moapa coriacea</i>	Endangered	No	Does not occur
Lahontan cutthroat trout	<i>Oncorhynchus clarki henshawi</i>	Threatened	No	Does not occur
Woundfin	<i>Plagopterus argentissimus</i>	Endangered	Yes	Does not occur
Colorado pikeminnow ⁴	<i>Ptychocheilus lucius</i>	Endangered	No	Does not occur
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered	No	Does not occur

¹ Historic observations in the study area, but no sightings during recent surveys.

² Sign observed within the project area during 2006 surveys.

³ One individual observed outside of the project area during 2006 surveys.

⁴ Extirpated from Nevada

⁵ Endangered only in the Virgin River

Based upon an analysis of habitat requirements and known distributions, it was determined that only 3 of the species in Table 3.4-4 have the potential to occur within the project area. These include the southwestern willow flycatcher, Yuma clapper rail, and desert tortoise. Although the relict leopard frog could potentially occur in the area, the species presence in the area was determined to be unlikely because of dense emergent cover in potential habitat, high numbers of predators (particularly bullfrogs), and distance from extant populations. The Devil's Hole pupfish, Pahrump poolfish, Lahontan cutthroat trout, Virgin River chub, and Moapa dace have very restricted distributions and do not occur in the project area. The Humpback chub and Colorado pikeminnow are believed to be extirpated from Nevada. The nearest population of Bonytail chub is below Hoover Dam. While the woundfin and razorback sucker could potentially occur in the area, their occurrence in the area is highly unlikely because the weirs in the lower Las Vegas Wash restrict upstream movements from Lake Mead into the project area.

Western Yellow-Billed Cuckoo

The western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) became a candidate for federal listing in June 2002. Critical habitat has not been designated for this species. The western yellow-billed cuckoo is a riparian obligate species that breeds and forages in large, mature stands of cottonwood and willow trees along rivers and streams (USFWS 2001). Dense understory vegetation has been identified as an important factor for nest site selection.

A western yellow-billed cuckoo was detected along the Las Vegas Wash in 1998 (SWCA 1998). Subsequent systematic surveys conducted along the Wash from 2000 to 2004 failed to detect any migrant or resident western yellow-billed cuckoos. Systematic surveys for western yellow-billed cuckoo were not conducted for the proposed project. Although the species is known to use tamarisk habitats in Arizona and New Mexico (Howe 1986; Corman and Magill 2000), the patch size and stature of the tamarisk community within the Wash is not considered to represent suitable habitat for the species. Given the absence of potential suitable habitat along the Las Vegas Wash, the western yellow-billed cuckoo is considered to not occur in the project area.

Southwestern willow flycatcher

The southwestern willow flycatcher (*Empidonax traillii extimus*) was listed as endangered in 1995 (USFWS 1995). Critical habitat was designated in 2005. There is no critical habitat for the southwestern willow flycatcher within or in the vicinity of the project area (USFWS 2005). The species is generally considered to be a rare transient in the project area.

The historical breeding range of the southwestern willow flycatcher includes southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, southwestern Colorado, and extreme northwestern Mexico. The southwestern willow flycatcher nests in native riparian communities, such as willow (*Salix* sp.), box elder (*Acer negundo*), buttonbush (*Cephalanthus* sp.), and cottonwood (*Populus fremontii*), as well as thickets of non-native tamarisk and Russian olive (Sogge et.al. 1997). Habitat characteristics include dense above-ground vegetation adjacent to slow-moving/still surface waters or saturated soils. Migrating or dispersing flycatchers may use areas less suitable for nesting, such as tamarisk-dominated riparian habitats, during spring and fall.

Intensive systematic surveys for the southwestern willow flycatcher have been conducted annually from 1998 to 2006 in the Las Vegas Wash. During the 1998 survey, two flycatchers were detected along the Wash. It was later concluded that these individuals were migrants due to the fact that they were detected only in the first of the three survey periods. In 1999, 2001 and 2005, no flycatchers were detected. Seven flycatchers were detected during the 2000 surveys. However, since no nesting behavior was observed and no individuals were detected on the third and final surveys, all seven were considered to be migrants. Two flycatchers were detected during both the 2002 and 2003 surveys, and

were all determined to be migrants. Eighteen flycatchers were detected in 2004 during the first survey period, but none were detected in the last four survey periods. All eighteen detections were later determined to be migrants.

A qualitative evaluation of habitat conditions along the Las Vegas Wash indicated that construction of Erosion Control Structures and wildfire in 2001 and 2002 substantially reduced the amount of potential suitable flycatcher nesting habitat (SWCA 2003). Additional factors that have adversely affected southwestern willow flycatcher habitat include lateral erosion of the Las Vegas Wash floodplain and the presence of the brown-headed cowbird (*Molothrus ater*).

Systematic surveys for the southwestern willow flycatcher within the project area were conducted in 2006 (SWCA 2007). Survey efforts were focused on areas containing potential suitable habitat, specifically dense stands of tamarisk, Fremont cottonwood, and Goodding's willow (*Salix gooddingii*) with greater than 75% canopy cover. None of the 500kV transmission line alternatives cross suitable habitat for the southwestern willow flycatcher. The Sunrise-Equestrian 230kV transmission line crosses the Wash and potential suitable habitat along the Las Vegas Wash.

One willow flycatcher was detected in the project area on May 5, 2006. This individual was spontaneously calling (not responding to taped calls), and was detected adjacent to the Sunrise-Equestrian 230kV transmission line route by biologists who were conducting surveys for the Yuma clapper rail (SWCA 2007). No southwestern willow flycatchers were detected during subsequent field investigations, including formal flycatcher surveys. Therefore, the individual that was detected in May was considered to be a migrant. As no resident flycatchers were detected during surveys, nest searches and monitoring activities were not conducted. These results support the general consensus that the southwestern willow flycatcher is a rare transient in the project area.

Yuma Clapper Rail

The Yuma clapper rail was federally listed on March 11, 1967, and is currently designated as endangered. The published range of this species includes Arizona, California, and Nevada; however, the current range of this species may be quite different from the published range (USFWS 2006). The species is generally considered to be a rare transient in the project area.

Yuma clapper rail habitat primarily consists of marshes dominated by cattail (*Typha* spp.), bulrush (*Scirpus* spp.), and/or reed (*Phragmites australis*), with the highest species densities occurring in cattail-bulrush marshes with moderate vegetative densities (Anderson and Ohmart 1985). The presence of ponds and/or flowing water is also a critical component of Yuma clapper rail habitat.

Information on the status of the Yuma clapper rails along the Las Vegas Wash prior to 1998 is lacking. The Yuma clapper rail was detected twice in 1998 during willow flycatcher surveys (SWCA 1998). Annual systematic Yuma clapper rail surveys, which were conducted between 2000 and 2006, failed to detect any clapper rails along the Las Vegas Wash.

The Sunrise-Equestrian 230kV transmission line crosses two areas of potential suitable habitat for the Yuma clapper rail. Systematic surveys conducted during 2006 failed to detect the species in the project areas (SWCA 2007). However, a Yuma clapper rail was visually detected along the Las Vegas Wash (approximately 1 mile west of the 230kV transmission line crossing) on June 4, 2006. Protocol surveys were subsequently conducted in this area on June 6 and 7, and one Yuma clapper rail responded to a broadcast call on June 7. No signs of nesting Yuma clapper rails were found, and the individuals detected on June 4 and 7 were determined to be migrants. These results support the general consensus that the Yuma clapper rail is a rare transient in the project area.

Desert Tortoise

The Mojave population of the desert tortoise (*Gopherus agassizii*) was listed as threatened in 1990 (55 FR 12178). The species occurs throughout the Mojave Desert in California, Nevada, Arizona, and Utah, and the species distribution roughly approximates the distribution of the creosote bush scrub community in the Mojave and Sonoran Deserts. It is found most often on flats and bajadas characterized by sandy to sandy gravelly soils, but may also occur on slopes and in rocky soils. Primary habitat for the desert tortoise includes desert creosote bush scrub communities that are characterized by creosote bush, white bursage, yuccas, cacti, grasses, and a wide variety of other perennial and annual plants. Preferred desert tortoise habitat includes scattered shrubs and a sufficient herbaceous understory, which provide a source of food, complementary hydration, and shelter. The USFWS formally designated more than 10,000 square miles of critical habitat for the species in 1994 (USFWS 1994b). No designated critical habitat for the tortoise occurs in the study area.

Desert tortoises in Nevada are primarily active between March and June, with a secondary activity period from September through October. During inactive periods, tortoises hibernate, estivate, or rest in subterranean burrows or caliche caves, spending as much as 98% of their time underground (Marlow 1979; Nagy and Medica 1986). Tortoises construct and maintain a series of single opening burrows.

Desert tortoise surveys were conducted within the project area (500kV and 230kV corridors). Prior to field surveys, biologists reviewed BLM and USFWS protocol for presence-absence surveys. Based upon discussions with BLM and Reclamation, it was determined that presence-absence surveys would be conducted for desert tortoise, habitat, and sign (e.g., scat, burrows, and carcasses) over the entire project area, and Zone of Influence (ZOI) surveys would be completed at 300 and 600 foot intervals out from the project area. ZOI surveys provide information on tortoise activity in the general area. The entire project area and the ZOI was surveyed using 30-foot wide belt transects between May 17 and June 15, 2006. Biologists searched for live tortoises, sign (tracks, scat, carcasses, and burrows), and habitat. All tortoises, sign (tracks, scat, carcasses, and burrows), and habitat were documented on Wildlife Survey Summary Forms. Riparian areas were not surveyed as they are not suitable desert tortoise habitat.

Based upon the field surveys, it is estimated that the 500kV and Sunrise-Equestrian 230kV corridors contain approximately 1,130 acres of desert tortoise habitat (SWCA 2007). The southern portion of the 230kV corridor and the eastern portions of the 500kV corridors represented the highest quality habitat. The portion of the project area immediately north of the Wetlands Park has been disturbed by OHV use and illegal dumping and appears to be the worst quality habitat in the survey area.

A total of five live desert tortoises and 129 locations of tortoise sign were observed within the project area (SWCA 2007). The majority of these observations occurred in the southern portion of the 230kV corridor and the eastern portions of the 500kV corridors (Figure 3.4-1). An additional 27 sign and one live tortoise were observed in the ZOI (SWCA 2007). The survey results indicate that the desert tortoise generally occurs at low densities throughout the project area with pockets of higher densities. The overall pattern of tortoise sign observation may be associated with OHV disturbance, food availability, and predation.

Sensitive Wildlife Species

A list of sensitive species for the project area was developed based upon review of the BLM Sensitive Species List (BLM 2007), NNHP data (NNHP 2007), MSHCP, and previous studies conducted in the area. The potential for individual sensitive species to occur within or in the vicinity of the project area was assessed by evaluating the species' habitat requirements, previous studies in the area, and

observations during surveys for the proposed project. Based upon this analysis, it was determined that a total of 39 sensitive wildlife species are known to occur or have the potential to occur in the project area either as residents or migrants/transients (Table 3.4-5).

Table 3.4-5 Sensitive Wildlife Species in Project Area

Common Name	Scientific Name	Status ¹	Occurrence in Project Area
REPTILES			
Banded Gila monster	<i>Heloderma suspectum cinctum</i>	F,B,N	Likely to occur
Chuckwalla	<i>Sauromalus obesus</i>	F,B,M	Observed during field surveys
BIRDS			
Golden eagle	<i>Aquila chrysaetos</i>	B	Known to occur
Western burrowing owl	<i>Athene cunicularia hypugea</i>	F,B,N	Observed during field surveys
Snowy plover	<i>Charadrius alexandrinus</i>	B	Likely to occur along Wash
Black tern	<i>Chlidonias niger</i>	F,B,N	Known to occur along Wash
Prairie falcon	<i>Falco mexicanus</i>	B	Observed during field surveys
Peregrine falcon	<i>Falco peregrinus anatum</i>	F,B,N,M	Observed during field surveys
Sandhill crane	<i>Grus canadensis</i>	B	May occur along Wash
Blue grosbeak	<i>Guiraca caerulea</i>	F,N,M	Known to occur along Wash
Western least bittern	<i>Ixobrychus elixis hesperis</i>	F,B,N	Known to occur along Wash
Loggerhead shrike	<i>Lanius ludovicianus</i>	B	Observed during field surveys
Phainopepla	<i>Phainopepla nitens</i>	F,B,N,M	Known to occur along Wash
Summer tanager	<i>Piranga rubra</i>	F,N,M	May occur
White-faced ibis	<i>Plegadis chihi</i>	F,N	Known to occur along Wash
Vermilion flycatcher	<i>Pyrocephalus rubinus</i>	F,N,M	Known to occur along Wash
Crissal thrasher	<i>Toxostoma crissale</i>	B	Known to occur along Wash
Lucy's warbler	<i>Vermivora luciae</i>	F,B,N	May occur along Wash
Arizona Bell's vireo	<i>Vireo bellii arizonae</i>	F,N,M	May occur along Wash
MAMMALS			
Pallid bat	<i>Antrozous pallidus</i>	B	Known to occur
Pale Townsend's big-eared bat	<i>Corynorhinus townsendii pallescens</i>	F,B	Known to occur
Big brown bat	<i>Eptesicus fuscus</i>	B	Known to occur
Spotted bat	<i>Euderma maculatum</i>	F	May occur
Greater western mastiff bat	<i>Eumops perotis californicus</i>	F,B	Known to occur
Allen's big-eared bat	<i>Idionycteris phyllotis</i>	F,B,N	Known to occur
Silver-haired bat	<i>Lasionycteris noctivagans</i>	B	Known to occur
Western red bat	<i>Lasiurus blossevilli</i>	B	Known to occur
Hoary bat	<i>Lasiurus cinereus</i>	B	Known to occur
California leaf-nosed bat	<i>Macrotus californicus</i>	F,B,N	Known to occur
California myotis	<i>Myotis californicus</i>	B	Known to occur
Small-footed myotis	<i>Myotis ciliolabrum</i>	F,B	Known to occur
Fringed myotis	<i>Myotis thysanodes</i>	F,B,N	Known to occur
Cave myotis	<i>Myotis velifer</i>	F	May occur
Long-legged myotis	<i>Myotis volans</i>	F,M	May occur
Yuma myotis	<i>Myotis yumanensis</i>	F,B	Known to occur
Big free-tailed bat	<i>Nyctinomops macrotis</i>	F,B	Known to occur
Western pipistrelle bat	<i>Pipistrellus hesperus</i>	B	Known to occur
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	B	Known to occur
Desert bighorn sheep	<i>Ovis canadensis nelsoni</i>	B,N	Sign observed during field surveys

¹ F = Federal Species of Concern; B = BLM Sensitive Species; N = Nevada State protected NRS 501-503; M = Species covered by the Clark County MSHCP.

Reptiles

The chuckwalla inhabits rock outcrops where cover is available between boulders or in rock crevices. It is typically found on slopes and open flats below 6,100 ft above msl (Stebbins 1985). Typical habitat includes rocky hillsides and talus slopes, boulder piles, lava beds, or other clusters of rock, usually in association with desert scrub habitat. The species is widely distributed in the rocky hills and mountain ranges that surround the Las Vegas Valley (BLM 1998). Suitable chuckwalla habitat occurs in the northeastern portion of the project area, and chuckwalla sign was observed during field surveys along the eastern portions of the 500kV corridors (Figure 3.4-1).

The banded Gila monster is commonly found on lower slopes of rocky canyons and arroyos with permanent or intermittent streams, but is also associated with desert flats supporting scrubs and succulents. The Gila monster digs burrows or finds shelter under rocks or in existing reptile and mammal burrows (Stebbins 1985). The banded Gila monster is likely to occur in the project area, although the species was not observed during field surveys.

Riparian Birds

The riparian communities associated with the Las Vegas Wash provide habitat for a number of sensitive bird species identified in Table 3.4-5. A number of these species have been previously observed along the Wash (CCWP 2007). Many are considered to be rare migrants/transients in the project area, including the snowy plover, black tern, sandhill crane, blue grosbeak, western least bittern, summer tanager, vermilion flycatcher, and Arizona Bell's vireo. Species considered to be common residents along the Wash include Phainopepla, Crissal thrasher, and white-faced ibis.

Upland Birds

The loggerhead shrike (*Lanius ludovicianus*) inhabits creosote scrub communities in the project area. The species is relatively common in the western U.S. The loggerhead shrike was observed by biologists on several occasions during field surveys for the proposed project. The species is known to occur throughout the project area.

Falcons and Raptors

The western burrowing owl (*Athene cunicularia*) inhabits grassland and shrub communities. They utilize abandoned, underground burrows of other animals and commonly perch on burrow mounds, fence posts, or other manmade or natural structures. They are opportunistic feeders, mostly eating beetles, grasshoppers, and other large arthropods. Other, larger prey animals include mice, rats, gophers, reptiles, and amphibians. Suitable habitat for this species occurs throughout the project area, and at least five individuals were observed during field surveys (SWCA 2007). Most of the owls were observed in a relatively small area along the 500kV corridors just north of the water treatment facility (Figure 3.4-1). Additionally, burrowing owl cough pellets and/or scat were identified in 76 burrows examined during field investigations. Most of the burrows used by burrowing owls were abandoned desert tortoise burrows. The species is known to occur in the project area.

The prairie falcon (*Falco mexicanus*) inhabits open country throughout the western U.S., including grasslands, canyonlands, prairies, tundra, deserts, foothills, and dry mountain valleys. Nests are typically built on rocky cliffs or ledges. The species is considered a common resident in southern Nevada. Suitable foraging habitat for the prairie falcon occurs throughout the project area. Additionally, the rugged terrain and cliffs in the northeastern portion of the study area (eastern end of the 500kV corridors) represent potential nesting habitat. Prairie falcons were observed soaring above the action area and roosting in the cliffs adjacent to the Alternative 1 corridor during field surveys (SWCA 2007). The species is known to occur in the project area.

The habitat requirements of the American peregrine falcon (*Falco peregrinus anatum*) are similar to the prairie falcon. The species forages in a variety of open habitat types and nests on cliffs. Where cliffs are lacking, manmade structures such as buildings and bridges are used for nesting. The peregrine falcon is a year-round resident species in southern Nevada. There is a known peregrine falcon eyrie on BLM land within the study area. The species has been observed at the Las Vegas Wash (LVWCC 2002). Peregrine falcons were observed soaring above the action area and roosting in the cliffs adjacent to the Alternative 1 corridor during field surveys (Figure 3.4-1, SWCA 2007). The species is known to occur in the project area.

The golden eagle (*Aquila chrysaetos*) inhabits a variety of open and semi-open habitats throughout the western U.S. Primary prey include small mammals such as jackrabbits, prairie dogs, and ground squirrels. Nests are typically built on cliffs. The species is considered to be an uncommon resident and migrant throughout Nevada. No golden eagles were observed in the project area during biological surveys. Golden eagles have been observed in the vicinity of the Las Vegas Wash (LVWCC 2004), and are known to occasionally occur in the project area.

Mammals

The project area contains suitable foraging and roosting habitat for a number of sensitive bat species. A primary source of information on bats species within and in the vicinity of the project area is the Las Vegas Wash Coordination Committee (LVWCC), which sponsored a two-year bat monitoring study that concluded in January 2006. This study investigated bat species diversity and activity along the Wash by utilizing acoustic monitoring systems. Data collected from the acoustic monitoring stations revealed the presence of 17 species in the Wash. All bat species that are classified as “known to occur” in Table 3.4-5 were recorded during this study. Based upon habitat conditions, several other sensitive bat species may occur in the area.

Little is known about the distribution of desert bighorn sheep in the project area. The Rainbow Gardens ACEC contains suitable habitat for the desert bighorn, and multiple pellet groups were observed in the northeastern portion of the project area (SWCA 2007). These findings suggest that bighorn sheep do occasionally use the ridges along the eastern portion of the 500kV corridors.

3.5 CULTURAL RESOURCES

3.5.1 Introduction

Reclamation, BLM, and NPC have recently signed a Programmatic Agreement (PA) which defines inventory, evaluation, consultation procedures, impacts and mitigation for the project regarding cultural resources located within the area of potential effect (APE) for the preferred alternative. This would satisfy compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations at 36CFR 800. Reclamation is the lead federal agency for this undertaking and the BLM–Las Vegas Field Office and the Nevada State Historic Preservation Office are cooperating agencies as defined by the PA.

For cultural resources, the APE for the double circuit 500kV line would include the transmission line corridor, access roads, work areas, and other facilities. The APE would consist of a 1,000-foot-wide (300 m) corridor; some access roads may be located within this corridor. The APE for access roads outside of the transmission line corridor would be a minimum of 100 feet (30 m) wide with at least 50 feet (15 m) on both sides of the centerline. The minimum APE for any staging areas or other temporary use area would be the footprint of the area plus 100 feet (30 m) outward in all directions from the perimeter of each area. The total length of the double circuit 500kV line would range between 7.0 and 7.4 miles (11.3 and 11.9 km). Of the 7.0 to 7.4 miles (11.3-11.9 km), 2.5 to 3.5 miles

(4.0-5.7 km) would be on lands administered by Reclamation, 1.5 to 3.1 miles (2.4-5.0 km) would be on public lands administered by the BLM, and 1.8 to 2.0 miles (2.8-3.2 km) would be on private land.

For cultural resources, the APE for the 230kV lines would include the transmission line corridor, access roads, work areas, and other facilities. The APE would consist of a 200-foot-wide (60-m-wide) corridor, of which 100 feet (30 m) would be needed for the construction corridor. Some access roads may be located within this construction corridor. The cultural resource inventory area for access roads outside of the transmission line corridor would be a minimum of 100 feet (30 m) wide with at least 50 feet (15 m) on both sides of the centerline. The minimum cultural resource inventory area for any staging areas or other temporary use area would be the footprint of the area plus 100 feet (30 m) outward in all directions from the perimeter of each area. The total LV #3 230kV transmission line would be 11.1 miles (17.9 km) long. Of the 11.1 miles (17.9 km), 4 miles (6.5 km) would be on public lands administered by the BOR and 7.1 miles (11.4 km) would be on private land. The total LV #1 230kV transmission line would be 5.5 miles (8.8 km) long. Of the 5.5 miles (8.8 km), 4.3 miles (6.9 km) would be on public lands administered by Reclamation and 1.2 miles (1.9 km) would be on private land.

SWCA, Inc. Environmental Consultants (SWCA) was contracted by POWER Engineers, Inc. for Nevada Power Company to conduct research into known cultural resources located within the project area. SWCA prepared a summary report of this research entitled *An Overview of Known Cultural Resources in the Sunrise Tap Project Area in Clark County, Nevada* (Robinson and Heersink 2007). This report provides the basis for the discussion of cultural resources provided here.

Reclamation, in cooperation with BLM, is conducting all tribal consultation. Although tribal consultation is ongoing, previous consultation for other projects (including the Wetlands Park, the Harry Allen-Mead 500kV transmission line project, and other utility projects) has resulted in no Indian Trust Assets or Sacred Sites being identified in the Sunrise Tap transmission line project area.

3.5.2 Overview of the Prehistory and History of the Area

The area of the Sunrise Tap Transmission Line Project has been used extensively throughout prehistory and history. The concentration of prehistoric and historical sites along the Las Vegas Wash resulted in the definition of the Las Vegas Wash Archaeological District (Perry 2001), which is discussed in more detail in Section 3.4.3 below. The Las Vegas Wash has been a major travel corridor through the prehistoric and historic periods since it connects the Colorado River with the Las Vegas Valley. Prehistoric use of the area extends sporadically back to the Paleoindian period, but occupation evidence of the area is most commonly found dating to the last 1,500 years. Subsequent to Paleoindian occupation of the area, several cultural influences manifest themselves in the general region. These include Anasazi, Patayan, and Numic traditions, among others. A substantial body of research has resulted in the production of a number of chronologies, many of which incorporate and summarize previous research (Blair and Wedding 2002; Blair et al. 1999; Ezzo 1995; Fowler and Madsen 1986; Lyneis 1982a, 1982b; Seddon and Ellis 2000; Seymour and Purcell 1995).

The Paleoindian period occupation of southeastern Nevada is not well defined due to a lack of substantial Paleoindian deposits – well-preserved and investigated occupations from this period are rare (Fowler and Madsen 1986:173). Indeed, some authors have created a single Paleo-Archaic Period spanning the years from 10,000 to 5,500 BC (Roberts and Ahlstrom 2000; Woodman et al. 2001; Woodman et al. 2003). Paleoindian sites are generally surface finds of fluted points that suggest at least a short-lived Clovis-complex presence in some parts of southern Nevada. The Tule Springs Site in Las Vegas Wash west of the project area may be the largest Paleoindian site in the surrounding area. However, the association between the artifacts and faunal remains at this site is unclear and the

Paleoindian age of this site has not been unquestionably established (Fitzwater 1967; Harrington and Simpson 1961). One fluted projectile point was identified in the Las Vegas Wash in the Clark County Wetlands Park by Roberts and Ahlstrom (2000), but no additional cultural deposits were found in association with this artifact.

The earliest Archaic sites in the Las Vegas Valley date to the Pinto period, around 5,000 B.C. However, few Pinto period sites or components have been identified; a difficulty that may indicate decreased occupation of the area (Warren and Crabtree 1986). Several sites with Pinto components have been investigated in the Las Vegas Valley area, mostly around Duck Creek and Yucca Mountain, including in the area of the Tule Springs (Ezzo 1995). Duck Creek is a tributary of the Las Vegas Wash. These sites are often limited to surface lithic scatters that are mixed with components of other time periods. A Gatecliff point has been recovered from Site 25CK6146 (Roberts and Ahlstrom 2000:80), though such points are not infallible temporal markers. Excavated Middle Archaic sites have yielded few temporally diagnostic artifacts, but charcoal and ash deposits have provided radiocarbon dates for these deposits (Ahlstrom et al. 2004). Throughout the larger region, Late Archaic sites are more common than Middle Archaic sites, and a few are located within a few miles of the Las Vegas Wash.

Following the Archaic Period is the Ceramic Period, spanning the years from approximately AD 300 to 1500. In southeastern Nevada three dominant agricultural groups are present: the Anasazi or Puebloan, the Patayan, and the Numic. It is difficult to discern the relationships and potential interactions of these groups – such subjects have been a topic of recent research. Since ceramics are the only cultural indicator at many sites from this period in the area, it is uncertain if they represent a Virgin River Branch Puebloan settlements or a trade network between the Las Vegas Valley inhabitants and established Puebloan settlements in the Moapa Valley and further east.

Cultural features associated with the Patayan tradition include what have been called "intaglios," "earth figures," or "geoglyphs" (Seymour 1999:18). These consist of areas where removal of desert pavement creates shapes and figures (Ezzo 1995:64). One of the few known intaglios in Nevada is the Las Vegas Wash Intaglio Site 26CK4509, which is eligible for the NRHP under criteria A, C, and D (Woodman and Valentine 1999). Stone alignments and rock rings may also be associated with the Patayan in the region (Ezzo 1995:64-65). Patayan ceramics are often found mixed with Virgin Puebloan wares and increase in frequency near the end of the period as the Puebloan assemblage declines in frequency (Ahlstrom et al. 2004). This has led Seymour (1997) to conclude that Patayan and Anasazi groups repeatedly used the same sites over long periods of time. The Las Vegas Wash area, particularly the Wetlands Park, has several sites dating to this period and more are found in the surrounding regions (Roberts and Ahlstrom 2000; Woodman et al. 2001). Site 26CK1139 may also have been used during the Late Ceramic Period as it contained evidence for Paiute occupation (Roberts and Ahlstrom 2000:23). Sites excavated as part of mitigation efforts for the Harry Allen to Mead Project include Early and Late Ceramic Period sites, as well as a number of fragile pattern sites for which no definite dates could be determined (Gilreath et al. 2007 Draft).

For the Las Vegas Valley, the date of 1600 is considered the time when indirect influences from the Spanish of New Mexico began to reach the area. Direct contact between Southern Paiutes and Euroamericans in southern Nevada did not occur until late in the eighteenth century. Prior to substantial permanent settlement by Euroamericans in the Las Vegas Valley, parties traveled through the area en route to other places. The first travelers to traverse portions of the what is now known as the old Spanish Trail were part of the Dominguez and Escalante party, although Francisco Garces was the first to cover the Mojave segment (Myhrer et al. 1990:10).

The two routes blazed by Domingues and Escalante, and Garces, were later connected by Jedediah Smith in 1826 (Myhrer et al. 1990:10), and this route was reinforced by Antonio Armijo, who was the first to take a commercial caravan along the route (McBride and Rolf 2001: Section 8 page 1). The route immediately became a major component of the trade network between the west coast and the interior of the continent. A number of subsequent travelers followed these expeditions.

Captain John C. Frémont was one of the later travelers to cross southern Nevada, opening up the “Old Spanish Trail” in 1844, but he was one of the first to travel from west to east through the Las Vegas Valley (Myhrer et al. 1990:10), and was the first expedition to give the name of “Spanish Trail” to the route (McBride and Rolf 2001: Section 7 page 1). With the publication of his notes and maps in 1845, this route began to be used by many travelers through the area (McBride and Rolf 2001: Section 7; Myhrer et al. 1990:69). This route was replaced in 1848 by routes to the north and south to travel between Santa Fe and San Gabriel (Myhrer et al. 1990). However, the Old Spanish Trail route was later merged into the Mormon Road for the portion between south-central Utah and San Bernardino, California, facilitating migration to California (Myhrer et al. 1990). This trail is listed on the National Register and is significant under the Transportation Research Theme and the Exploration and Settlement Sub-theme in the Nevada state context (McBride and Rolf 2001: Section 8 page 1).

Sustained contact between Native American groups and Euroamericans did not occur until well into the nineteenth century. The first Euroamericans to permanently settle in southern Nevada were members of the Church of Jesus Christ of Latter-day Saints (Mormons), whose goal, in part, was the establishment of a route between Salt Lake City and southern California. Their initial settlement in the area was in Las Vegas, to the southwest of the Sunrise Tap area (Tingley 1992).

As the Mormon settlements grew, they developed irrigation networks for farming the land. They soon concluded, however, that the area was covered with alkaline soils and was not suitable for large-scale farming. By 1857 most of the Mormon settlers had headed back to Utah; by the end of that year southeastern Nevada was largely unpopulated by Euroamericans. This changed with the Homestead Act of 1862, and the formation of the Nevada Territory in 1864, which attracted new settlers to the territory with the promise of 160-acre land allotments to settlers with full ownership bestowed after five years residency on the land (Milner 1994:153). The Act had far-reaching effects since it allowed immigrants with even modest incomes to afford a part of the American Dream and pushed the nation's frontier ever westward. Southeastern Nevada was once again populated and agricultural activities soon became the main economic activity of the Las Vegas Valley. The community became a major supply stop on the now well-traveled Mormon Trail. Despite the community's new focus on agriculture and its recovered role as an important traveler's way station, Las Vegas remained a generally small and quiet settlement until the arrival of the railroad. By the beginning of the new century, the American West was becoming increasingly urbanized, including population expansion throughout the Las Vegas Valley.

During World War I, southeastern Nevada remained primarily a central railroad stop and cargo depot on the way to and from the northern Nevada mining camps. The signing of the Colorado River Compact in 1922 resulted in the annual grant of 300,000 acre feet of previously untapped water to Nevada and set in motion the activities necessary to bring the water from the river to the southeastern part of the state (Hulse 1991:192-193). This, along with the federal government's proposal to construct the Boulder/Hoover Dam lead to a thriving Las Vegas during the 1920s, though this prosperity was lessened by the Great Depression. The dam began impounding water in 1935, and all of the major transmission lines were completed by the close of the 1930s. Major transmission lines leading from the dam to Lincoln County and Pioche include the LV #1 and LV #3 lines, respectively, which are proposed for upgrades as part of this proposed project. People working to build the dam and at other industrial enterprises created squatter settlements throughout the Las Vegas Wash area,

as well as in the surrounding mountains. Remains of some of the squatter settlements are among the sites identified within the Las Vegas Wash.

Construction of the Hoover Dam and its associated transmission lines set the Las Vegas Valley on a path of residential and commercial expansion unlike anything previously experienced in the area. The transmission lines supported growth in the core area of the Las Vegas Valley and in outlying towns and cities as well. Continued expansion, powered by electricity from the dam, has brought the area to the state of expansive and nearly continuous development seen in the Las Vegas Valley today. Transmission lines from the dam have affected development beyond the Las Vegas Valley, including development in the neighboring states of Arizona and California.

3.5.3 Identification of Cultural Resources

Substantial portions of each alternative alignment have been included in previous cultural resource surveys. Although none of the alternatives for the 500kV alignments have been completely inventoried for cultural resources, the data provided here provide a basis for comparisons among alternatives. The existing survey coverage of portions of the alignments and nearby areas provides information to characterize human use of the area and expectations for sites in the APE. Thus, data from those previous surveys and documentation of identified cultural resources are used to make a comparative assessment of cultural resources located along each alignment.

Existing data were collected from the site and project files at the Harry Reid Center for Environmental Studies at the University of Nevada, Las Vegas (HRC) with supplemental information supplied by Ms. Laureen Perry of the Bureau of Reclamation. Previous projects had identified 35 cultural resource sites located along the alternatives. All of the previous projects were evaluated to determine whether accepted modern standards of cultural resource inventory were employed (Robinson and Heersink 2007). In all, 20 previous cultural resource projects provide data relevant to this analysis and these previous projects provide coverage of approximately 65% of the alignments.

The majority of these previous projects have been reviewed by a federal agency as well as by the Nevada State Historic Preservation Officer. The federal agencies have made determinations and the Nevada State Historic Preservation Office has concurred on NRHP-eligibilities for most of the sites located along the alternative alignments, although a few of the sites remain unevaluated. Thus, previous work in the area provides the existing data and the threshold by which to measure differences in the cultural resource affected environment along each alignment. Reclamation and BLM have accepted this analysis of existing data as sufficient for evaluation of the impacts of each alternative on cultural resources. A 100% pedestrian survey will be conducted for the preferred alternative.

In order to ensure that site types common to particular environments along the alignments are represented in the analyzed data, the areas inventoried by the previous projects were analyzed by environmental zones adopted from the Southwest Regional GAP Analysis program (U.S. Geological Service 2004). The alternatives include seven environmental regions defined mainly by geography and vegetation (U.S. Geological Service 2004)). Using the vegetation data provided more detailed partition of the alternatives than did geophysical data alone. For all of the alternatives, well over 20% of each environmental zone has been surveyed by previous projects.

All of the alternatives include replacement of the existing historic 69 kV LV #3 power line with a new 230 kV line. Thus, all of the alternatives in the proposed action would affect the historic Las Vegas #3 power line, Site 26CK6150, which crosses the Wetlands Park.

The results of research into known cultural resources within the project area are summarized in Table 3.5-1 below. Alternative 1 crosses four known cultural resource sites; one has been determined eligible for the NRHP, two remain unevaluated, and one has been determined not eligible for the NRHP and is not considered further. Alternative 2 crosses eight known cultural resource sites: two have been determined eligible for the NRHP, one remains unevaluated, and the remaining five have been determined not eligible for the NRHP and are not considered further. Alternative 3 crosses four known cultural resource sites: two have been determined eligible for the NRHP, and two have been determined not eligible for the NRHP and are not considered further. Alternative 4 crosses 12 known cultural resource sites: three have been determined eligible for the NRHP, two remain unevaluated, and the remaining seven have been determined not eligible for the NRHP and are not considered further.

Table 3.5-1 NRHP-Eligible and Unevaluated Sites

Alternative Alignment	Site Number	Temporal Affiliation	Site Type	NRHP Eligibility
Alternative 1	26CK6150	Historic	Transmission Line	Eligible
Alternative 1	26CK6493	Prehistoric	Rock clusters, artifact scatter	Unevaluated
Alternative 1	26CK6497	Prehistoric	Rock clusters, lithic scatter	Unevaluated
Alternative 2	26CK6150	Historic	Transmission Line	Eligible
Alternative 2	26CK1285	Prehistoric	Prehistoric complex, rock rings and artifacts	Eligible
Alternative 2	26CK6488	Prehistoric	Trail, rock ring, lithic scatter	Unevaluated
Alternative 3	26CK6150	Historic	Transmission Line	Eligible
Alternative 3	26CK1285	Prehistoric	Prehistoric complex, rock rings and artifacts	Eligible
Alternative 4	26CK6150	Historic	LV #3 Transmission Line	Eligible
Alternative 4	26CK1285	Prehistoric	Prehistoric complex, rock rings and artifacts	Eligible
Alternative 4	26CK1300	Prehistoric	Prehistoric complex, rock rings and artifacts	Eligible
Alternative 4	26CK6493	Prehistoric	Rock clusters, artifact scatter	Unevaluated
Alternative 4	26CK6497	Prehistoric	Rock clusters, lithic scatter	Unevaluated

In addition to the previously identified sites, at least one other historical resource, the LV #1 transmission line, which emanates from Hoover Dam, is located within the project area. The LV #1 line has not been previously documented as part of a federal undertaking, and has not yet been assigned a Nevada State site number, and therefore has not been evaluated for eligibility for the NRHP. Other historical resources may include historical roads, canals, and other features shown on General Land Office plat maps; these features are likely to have been destroyed during residential and commercial development of the area. The PA developed for this project would guide identification, evaluation, and mitigation efforts for these resources, as for all historic properties.

In addition to specific sites, all alternatives cross the Las Vegas Wash Archaeological District, which was defined as a district in 1977 and listed on the NRHP in 1980. Of the 37 sites in the original nomination documentation, 13 were excavated as mitigation for a project that was never completed (Archaeological Research Center 1982; Perry 2001). Although the District was not considered in management decisions for a long period of time, it has since been revised and updated, is considered eligible for the NRHP under Criteria C and D (Perry 2001), and is now considered in management decisions. Eligibility under Criterion C is included to accommodate components of the District that

lack individual distinction, such as some of the cleared circles and rock rings, but which have been determined to be significant as a group at the regional landscape level (Perry 2001). Eligibility under Criterion D is based on the demonstrated data potential of the sites in the District (Perry 2001). Current research at sites in the Las Vegas Wash conducted as mitigation for the Harry Allen-Mead 500kV Transmission Line Project provides additional information about the data potential and NRHP-eligibility of the fragile pattern sites (Gilreath et al. 2007).

Research themes have been identified for the District, including “Settlement: Life in a Desert Oasis,” which applies to both prehistoric and historical sites (Perry 2001; Roberts and Ahlstrom 2000; Woodman et al. 2001: 101-106). Additional themes for prehistoric sites include: subsistence, technology, and cultural groups and boundaries, while historical sites have a research theme of farming/ranching/mining (Perry 2001; Roberts and Ahlstrom 2000; Woodman et al. 2001: 101-106).

The boundary of the District has been updated to reflect current development projects and to include newly identified sites (Perry 2001). The District currently includes a variety of prehistoric and historic sites, all located along Las Vegas Wash; most of the sites with research potential are located within the Clark County Wetlands Park along Las Vegas Wash, with a few sites north of the boundary on land owned by Reclamation (Perry 2001).

3.6 Paleontological Resources

3.6.1 Introduction

SWCA was contracted by Power Engineers to conduct a preliminary paleontological resources assessment for the Sunrise Tap Transmission Line Project for the purposes of evaluating the paleontological resource potential (sensitivity) of the geologic units within the Project APE. The study was accomplished by reviewing pertinent scientific literature, geologic maps, and museum agency records. The results of the study are presented in a report entitled Paleontological File Search Results for the Sunrise Tap Project (SWCA 2008). This report provides the basis for the following discussion.

3.6.2 Methodology and Resource Assessment Criteria

Occurrences of paleontological resources are closely related to the geologic units that contain them. The potential for finding important paleontological resources can therefore be broadly predicted by the presence of the pertinent geologic units at or near the surface. Therefore, geologic mapping can be used as a proxy for assessing the potential for the occurrence of important paleontological resources.

The geologic units within the Project APE were identified using the geologic maps published by Bell and Smith (1980), Bingler (1977), Matti, et al. (1993), and Castor, et al. (2000) (Figure 3.6-1, Table 3.6-1). As reported by these authors, a total of 37 mapped geologic units underlie the Project APE. For the purpose of this study, these units were combined into six units on the basis of time-equivalency and/or similar lithology. These units are, in approximate ascending stratigraphic order, (1) Tertiary volcanic rocks (2) Rainbow Gardens Member, Thumb Member, Bitter Ridge Limestone Member and Lovell Wash Member of the Horse Spring Formation, (3) Muddy Creek Formation (4) Quaternary alluvial fan and fluvial deposits, (5) Quaternary pediment and fan deposits, and (6) Modern wash deposits, active alluvium, sand dune deposits, and artificial fill.

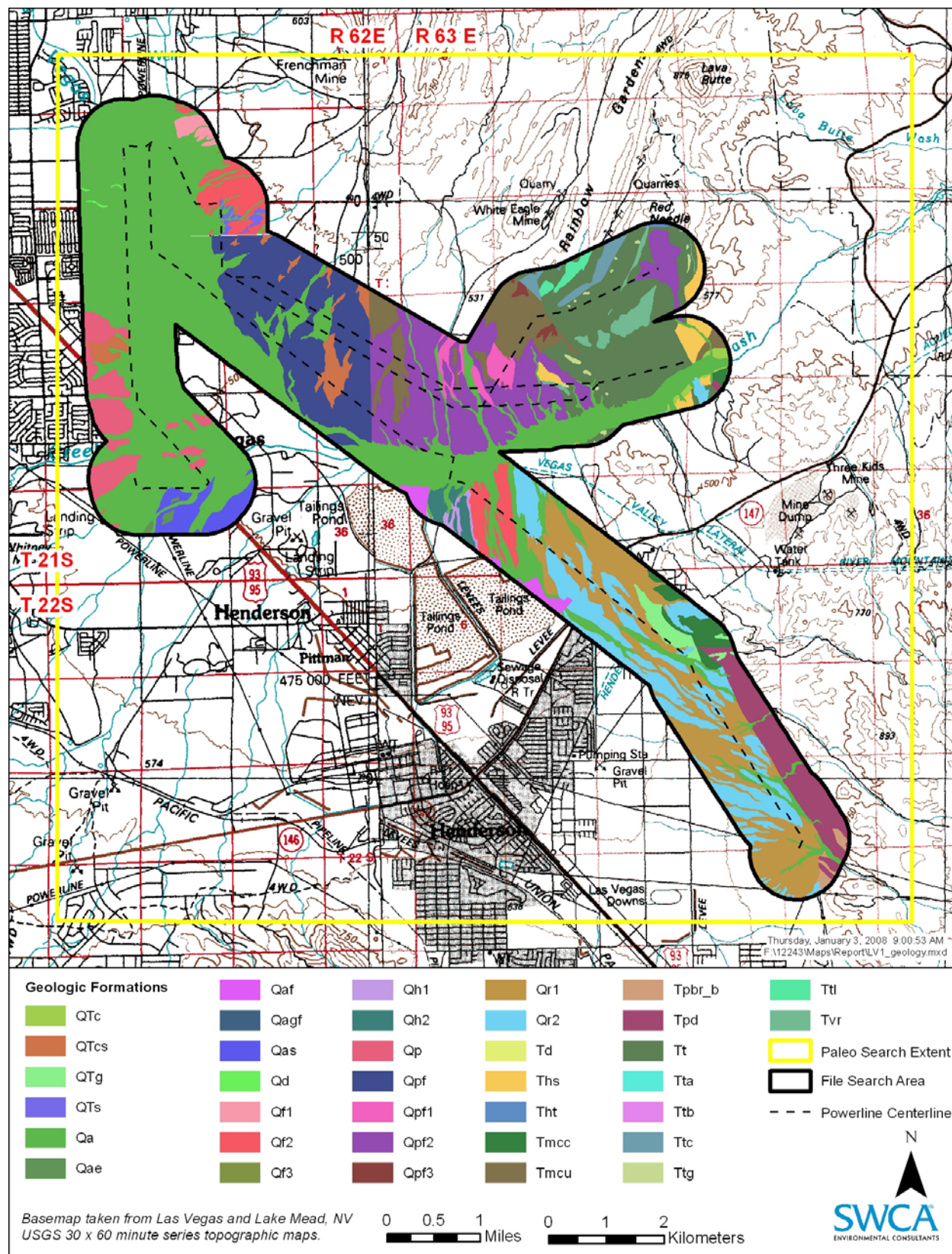
Each geologic unit determined to occur within the Project APE was ranked according to the Potential Fossil Yield Classification System (PFYC). The PFYC rankings (summarized below) were used to construct a paleontological sensitivity map of the Project APE (Chapter 4, Figure 4.6-1).

Potential Fossil Yield Classification System (PFYC)

Under the PFYC system, geologic units are classified based on the relative abundance of vertebrate fossils or uncommon invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating a higher potential. The classification system is intended to provide baseline guidance to assessing and mitigating impacts to paleontological resources. PFYC classes are summarized below.

Class 1 geologic units are not likely to contain recognizable fossil remains and are therefore considered to have no sensitivity (no impact to paleontological resources is expected). Geologic units designated with a Class 2 are not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils and are considered to have a low sensitivity (little to no impact to paleontological resources expected). Class 3 geologic units are fossiliferous sedimentary geologic units where fossil content varies in significance, abundance, and predictable occurrence and have moderate sensitivity (moderate impact). Class 4 units are Class 5 units with lowered risks of adverse impacts due to local conditions such as surficial cover and topography. Class 5 geologic units are highly fossiliferous and regularly and predictably produce vertebrate fossils or uncommon invertebrate or plant fossils. These units have a have high sensitivity and a high impact to paleontological resources is expected.

Figure 3.6-1 Distribution of Geological Units within the Sunrise Tap Project Area



3.6.3 File Search Results

The scientific literature review and museum records search conducted for this study found that twelve paleontological localities in the Horse Spring Formation have been recorded either within the Project APE or within one-half mile of the boundary of the APE. Additionally, one paleontological locality was discovered in the Muddy Creek Formation within one-half mile of the project boundary.

With only extremely rare exceptions, volcanic (extrusive igneous) rocks do not contain fossils and thus have low paleontological sensitivity (PFYC *Class 1*). Holocene-age surficial sedimentary deposits contain the unfossilized remains of modern organisms, but are too young to contain fossils, and are thus also considered to have low paleontological sensitivity (PFYC *Class 2*). Deposits of Pleistocene-age (pre Holocene Quaternary), particularly fine-grained alluvium and spring deposits, are known to contain locally abundant and scientifically significant vertebrate fossils (including reptiles, birds, and mammals) in the Las Vegas area. The sensitivity of similar deposits within the project APE is uncertain, and they are considered to have moderate paleontological sensitivity (PFYC *Class 3*) until field reconnaissance can better evaluate their potential to contain significant fossils. The late Miocene-age Muddy Creek Formation has yielded fossilized skeletal remains of amphibians, reptiles and mammals, as well as animal trackways. Of middle Miocene-age, the Horse Spring Formation is the oldest sedimentary rock unit within the project APE, and has produced fossilized remains of plants and mammal and bird trackways. Because the latter two units have yielded vertebrate skeletal remains and trace fossils (fossil trackways), they are both considered to have high paleontological sensitivity (PFYC *Class 5*).

Table 3.6-1 Summarized Paleontological Sensitivities of Geologic Units within the Sunrise Tap APE and Recommended PFYC Designations

Geologic Unit	Map Abbreviation*	Age	Typical Fossils	PFYC Designation
Modern wash deposits, active alluvium, sand dunes, artificial fill	Qa, Qd, Qaf	Holocene	No in situ fossil remains	<i>Class 2</i>
Quaternary pediment and fan deposits of Henderson, River Mountains, Frenchman Mountain, and east Las Vegas	Qf1, Qf2, Qf3, Qp, Qpf, Qpf1, Qpf2, Qpf3, Qh1, Qh2, Qr1, Qr2, Qas, Qae	Pleistocene to Early Holocene	Scattered and mostly poorly preserved mammal bones known from fine-grained facies of similar deposits elsewhere	<i>Class 2</i>
Quaternary alluvial and fluvial deposits	QTg, QTc, QTs, Qagf	Pliocene to Early Pleistocene	Vertebrates known to occur from fine-grained facies of similar deposits elsewhere in Las Vegas area	<i>Class 3</i>

Muddy Creek Formation	Tm, QTcs, Tmcc, Tmcu	Late Miocene	Localized occurrences of vertebrates (mammals, amphibians, and reptiles), mammal trackways	<i>Class 5</i>
Geologic Unit	Map Abbreviation*	Age	Typical Fossils	PFYC Designation
Horse Spring Formation: Rainbow Gardens Member, Thumb Member, Bitter Ridge Limestone Member, Lovell Wash Member	Ths, Ttg, Tt, Ttl, Ttc, Tta, Ttb, , Tht,	Miocene	Fragmentary plant stems and leaves, a diverse assemblage of mammal trackways	<i>Class 5</i>
Mid-Tertiary volcanic rocks of the River Mountains, Miocene volcanic rocks of Rainbow Gardens and north of Lake Mead Drive	Tpd, Tvr, Td, Tpbr_b	Tertiary	None	<i>Class 1</i>

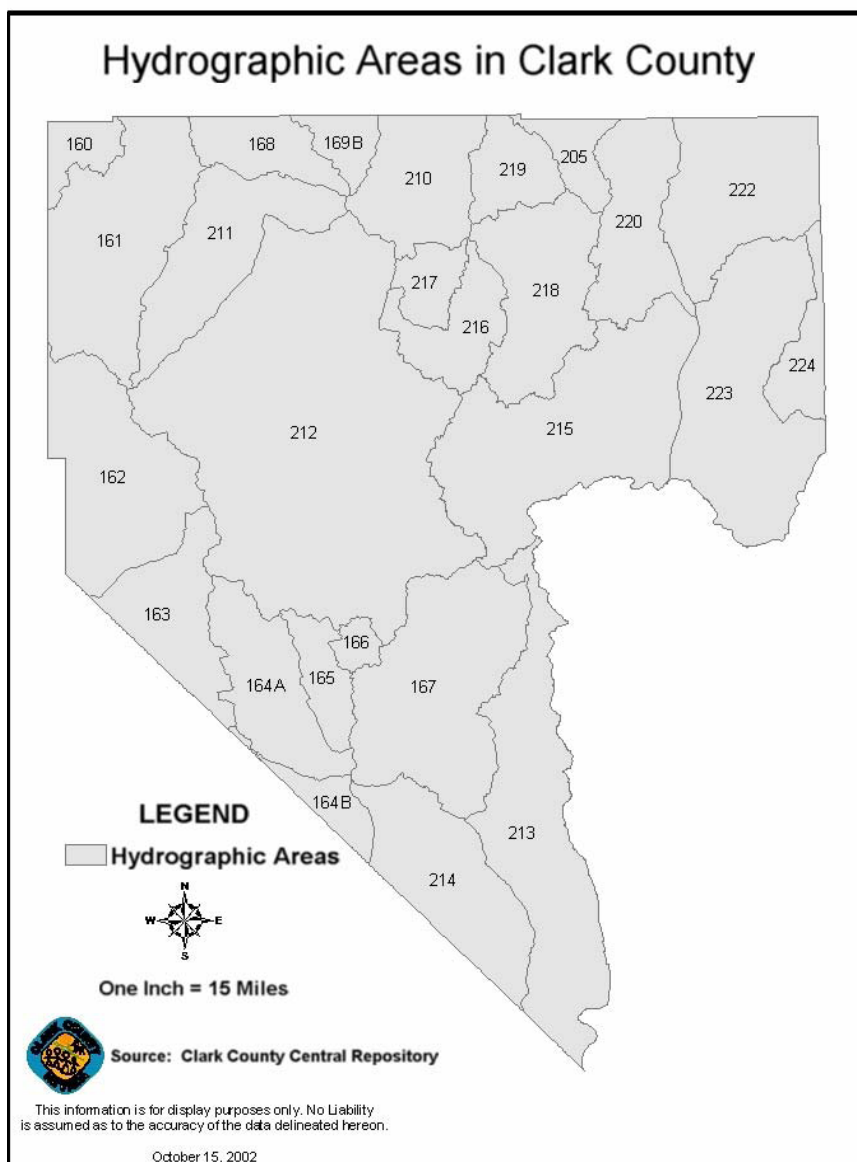
3.7 AIR QUALITY

3.7.1 Environmental Setting

The Proposed Action is located within Clark County in southern Nevada and is primarily located within the Las Vegas Valley hydrographic area (212) or air quality region of Clark County (Figure 3.7-1). The State of Nevada uses hydrographic areas to define air quality management areas for planning purposes. The hydrographic areas represent natural and manmade stream-drainage areas or basins (DAQEM 2004).

The Las Vegas Valley is a broad desert valley that comprises about 600 square miles, and is generally bounded on the north by the Sheep Mountains, on the west by the Spring Mountains, on the south by the McCullough Mountains, and on the east by the River and Frenchman mountains. These mountain ranges provide channeling and barriers to air pollution transport. Strong winds are the most persistent and provoking weather hazard experienced in the area. Winds over 50 mph are infrequent but can occur with some of the more vigorous storms. Winter and spring wind events often generate widespread areas of blowing dust and sand. Strong wind episodes in the summertime are usually connected with thunderstorms, and are thus more isolated and localized. Prevailing wind direction is typically either southwest or north, unless associated with a thunderstorm.

Figure 3.7-1 Hydrographic Areas in Clark County



More than 95 percent of the Clark County population is located in the Las Vegas Valley, which is one of the fastest growing metropolitan areas in the nation. The population expanded from about 400,000 in 1980 to 1.9 million in 2006. The area also attracts 38.2 million visitors annually.

3.7.2 Regulatory Setting

Federal

The Federal Clean Air Act (CAA) of 1970, 42 USC 7401 et seq. as amended in 1977 and 1990, establishes National Ambient Air Quality Standards (NAAQS). The EPA has developed primary and secondary NAAQS for six criteria air pollutants, including: O₃, NO₂, CO, SO₂, PM₁₀, and PM_{2.5}. Areas of the country that are currently in violation of NAAQS are classified as non-attainment areas, and new sources to be located in or near these areas are typically subject to more stringent air permitting requirements than similar sources in attainment areas.

State

The State of Nevada's air pollution statutes (Chapter 445B of Nevada Administrative Code) seek to achieve and maintain levels of air quality which will protect human health and safety, prevent injury to plant and animal life, prevent damage to property, and preserve visibility and scenic, esthetic and historic values of the State. These statutes require the use of reasonably available methods to prevent, reduce, or control air pollution throughout the State of Nevada.

Local

The Clark County Department of Air Quality and Environmental Management (DAQEM) implements and enforces the air pollution control program in Clark County, Nevada. DAQEM applies and enforces Clark County Air Quality Regulations, monitors ambient air quality, develops proper control measures, and educates the citizens of Clark County on air quality issues.

3.7.3 Ambient Air Quality Standards and Pollutants of Concern

Ambient air quality is primarily a result of the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and meteorological conditions. NAAQS are the maximum levels of background pollution considered safe for public health and welfare. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The DAQEM operates and maintains an ambient air monitoring network throughout Clark County that measured the ambient concentrations of EPA criteria pollutants including particulate matter less than 10 microns (PM_{10}), and 2.5 microns ($PM_{2.5}$) in diameter, carbon monoxide (CO), ozone (O_3), nitrogen oxides (NO, NO_2 , NO_x), and sulfur dioxide (SO_2). During 2006, Clark County remained designated as serious non-attainment for CO and PM_{10} ; and basic non-attainment for O_3 (DAQEM 2007). The CAA defines a non-attainment area as "...any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant...". In general, CO and O_3 have remained steady over the past few years, while PM_{10} has declined.

3.8 TOPOGRAPHY, GEOLOGY, AND SOILS

3.8.1 Topography

The Las Vegas Valley lies within the southern margin of the Great Basin in the Basin and Range physiographic province. This province is characterized by a series of north-south trending mountain ranges separated by alluviated valleys. The existing topography in the project area is largely the result of repeated episodes of deposition, uplift, igneous activity, and erosion (Bedinger et al. 1989). Elevations within the project area range from 3,080 feet above msl in the northeastern portion of the project area to approximately 1,440 msl where the Harry Allen-Mead transmission line crosses the Las Vegas Wash. Topographic characteristics vary considerably throughout the project area. Most of the area is characterized by gentle to moderate terrain that generally slopes towards the Las Vegas Wash. The northeastern portion of the project area contains rough terrain with steep slopes and cliffs interspersed by gently sloping alluvial valleys.

The proposed 500kV and 230kV transmission line routes generally cross gentle to moderate terrain, except for some relatively rugged topography that occurs in eastern portions of the 500kV corridors.

The Alternative 1 corridor begins at a tap point at 1,580 msl, runs up an alluvial wash to a saddle at 1,760 msl, heads down to the intersection with the SNWA pipeline road at 1,580 msl, and then runs to the Sunrise Substation at 1,700 msl. Alternatives 2, 3, and 4 begin at a tap point at 1,460 msl, go over a small ridge 1,620 msl, and then run to the Sunrise Substation at 1,700 msl.

3.8.2 Geology

The Las Vegas Valley is a structural basin that contains Miocene to Recent unconsolidated sediments overlying Paleozoic bedrock. Two major geologic units, bedrock and valleyfill sediments, characterize the Valley geology. The mountain ranges along the eastern Las Vegas Valley consist primarily of Paleozoic and Mesozoic sedimentary rocks including limestone, siltstone, and sandstone. Bedrock units in the Rainbow Gardens ACEC range in age from Proterozoic through late Miocene (Castor et al. 2006). Proterozoic schist and gneiss is overlain by relatively thin Cambrian sandstone and shale and a thick sequence of carbonate-dominated rock. Mesozoic rocks, mainly composed of shallow marine to non-marine Triassic and Jurassic redbeds, with some carbonate and gypsum beds, are capped by eolian sandstone. Rocks of the uppermost layers include red sandstone with some carbonate rocks and tuff (Castor et al. 2006).

Valleyfill sediments consisting of unconsolidated Quaternary alluvium of the Muddy Creek Formation underlie the lower elevations. The Muddy Creek Formation is composed of sandstone and siltstone with local gypsum, limestone, and conglomerate units. The alluvium includes clays, silts, and sands with areas of coarse, gravelly deposits along old floodplains (Longwell et al. 1965).

Most of the project area is underlain by alluvial deposits within the Muddy Creek Formation, including the Las Vegas Wash. The northeastern portion of the project area is underlain by the Horse Spring Formation (Castor et al. 2006). This formation corresponds with the rugged terrain and ridgelines in the vicinity of the tap points and eastern end of the 500kV corridors. This is the only portion of the project area that has exposed bedrock. The Horse Spring Formation consists of clastic and tuffaceous sedimentary rock including limestone, gypsum, and volcanic rock. This formation, which is exposed on the ridges and divides that are crossed by the 500kV corridors, tends to be relatively unstable.

Seismicity in southern Nevada is relatively low compared to more active parts of the Basin and Range Province (USGS 2001). There have been no major earthquakes in the vicinity of Las Vegas since at least 1852. The project area includes several small faults that are within larger Sunrise-Frenchman-River Mountain fault zone, which diverges into smaller faults near the Las Vegas Wash (Longwell et al. 1965). The Frenchman Fault, also referred to as the Sunrise-Frenchman-River Fault, runs northwest-southeast through the northern portion of the project area (Castor et al. 2006). The project site is located within Seismic Zone 2B which represents a low to moderately active seismic area (USGS 2001).

Land subsidence due to heavy pumping of groundwater in the aquifer systems of the Las Vegas Valley has been documented (Bell 1981). Subsidence results when the water-bearing layers no longer contain groundwater and compress downward, resulting in a lowered ground elevation. Subsidence of up to 2 feet has occurred in the central portion of the Las Vegas Valley (Bell 1981). However, subsidence has generally not affected the project area due to the relative location in the regional drainage basin and associated high groundwater table (USGS 2001).

3.8.3 Soils

There are 19 soil map units within the project area (NRCS 2007). These soils generally include poorly sorted, unconsolidated to cemented gravel and sandy gravel, deep, well-drained alluvial soils, and

shallow soils on hills and mountains interspersed with rock outcrops and badland. Most of the soils in the project area can be generally described as having a permeability ranging from moderately slow to moderately rapid, low to moderate shrink-swell potential, and slight to severe potential for erosion. None of the soils in the project area are classified as hydric. The following soils within the project area have a severe potential for erosion:

- Akela-Rock outcrop complex
- Bracken gravelly fine sandy loam
- Bracken-Arizo-Badland association
- Callville association
- Rock outcrop-Redneedle-Heleweiser association
- Sunrock-Haleburu-Rock outcrop association
- Tonopah-Arizo association

3.9 WATER RESOURCES

3.9.1 Surface Water

Las Vegas Wash

The Las Vegas Wash represents the only surface water in the project area. The Wash is the primary surface-water conveyance corridor of surface water runoff from the Valley to Lake Mead. The watershed encompasses approximately 1,550 square miles, and is generally bounded on the north by the Sheep Mountains, on the west by the Spring Mountains, on the south by the McCullough Mountains, and on the east by the River and Frenchman mountains (CCRFCFCD 2002). The terrain in the watershed include steep mountain slopes that transition to alluvial fans, which in turn drain to braided washes, sheet flow areas, and incised washes. There are many small ephemeral washes in the area that drain into the Las Vegas Wash.

The Las Vegas Wash is a perennial stream with primary water sources including wastewater treatment plant discharge, groundwater seepage, precipitation, and runoff from urban areas. The average base flow is approximately 283 cubic feet per second (cfs), with approximately 252 cfs derived from the discharge of three wastewater treatment plants (United States Bureau of Reclamation and National Park Service 2005). Peak flows are associated with storm events, and flows as high as 16,000 cfs have been recorded at Lake Las Vegas (CCRFCFCD 2002).

Historically, the Las Vegas Wash was relatively stable in terms of erosion and degradation. Under natural conditions, runoff from major rainfall events transported large amounts of sediment to the Wash where it was deposited along a wide, shallow floodplain. This influx of sediment offset soil loss associated with channel degradation and lateral bank migration. Human activity in the watershed has drastically changed the balance of sediment inflow and has resulted in an acceleration of erosion, increased lateral bank migration, and channel incision. Three major causes of the accelerated erosion include urban development (reduces infiltration and increases runoff), construction of detention basins (reduces the influx of sediment), and the introduction of a large continuous base flow from wastewater treatment plant effluent that carries no sediment load (United States Bureau of Reclamation and National Park Service 2005).

Over the last 30 years, the elevation of the primary channel has been lowered by 30 feet and approximately 1,800 of 2,000 acres of wetlands have been lost (Hestor and Gear 2002). Efforts to stabilize the Wash channel are currently underway. SNWA is in the process of constructing a series of 26 erosion control structures (ECSs) and over five miles of bank protection within and adjacent to the

Wash (CCRFCDC 2002). It appears that the ECSs and bank protection have reduced channel degradation and erosion in the Las Vegas Wash.

Water quality of the Las Vegas Wash has been established through a long-term monitoring program (United States Bureau of Reclamation and National Park Service 2005). The pH values in the Las Vegas Wash are within the required range for sustaining designated beneficial uses. Dissolved oxygen levels are adequate to support fish. However, the Wash is considered poor habitat for most fish species because of the high flow velocities, suspended sediment, unstable bottom, and more recently, blockage by ECSs. The Wash generally has low levels of algae, fecal coliform, and total suspended solids (TSS), except during storm runoff events when TSS values increase due to runoff.

The 5-mile segment of the Las Vegas Wash below Telephone Line Road is on Nevada's 2002 303(d) *Impaired Waters List* due to total iron and TSS (NDEP 2002). The majority of iron is in particulate form in sediment, and TSS values are highest during runoff events. This segment of the Wash also has relatively high selenium concentrations.

Floodplains and Wetlands

The 100-year floodplain has been delineated along the Las Vegas Wash by the Federal Emergency Management Agency (FEMA). The width of the 100-year floodplain varies significantly along the Wash, ranging from less than 200 feet wide where the wash has been channeled (i.e., between Vegas Valley Drive and Desert Inn Road) to over 2,000 feet in lower reaches of the Wash (i.e., Pabco Road area). FEMA floodplain mapping indicates that none of the 500kV corridors are located within the 100-year floodplain (FEMA 2002). The existing transmission line (proposed 230kV route) crosses the Wash and associated floodplain in two locations. These include one crossing immediately west of the City of Las Vegas Advanced Water Treatment Facility and a second crossing at Pabco Road.

Freshwater wetlands possess three essential characteristics: hydrophytic vegetation, hydric soils, and wetland hydrology. Although no formal wetland delineations were completed for the proposed project, portions of the Las Vegas Wash support communities dominated by hydrophytic vegetation. These areas are likely to support soils and hydrological characteristics that are consistent with jurisdictional wetlands. As previously noted, the Sunrise-Equestrian (LV #3) existing transmission line does cross the Las Vegas Wash at two locations. Although there are no hydric soils in the project area (Section 3.8-3), there may be jurisdictional wetlands within the 230kV transmission line corridor at these crossings.

3.9.2 Groundwater Resources

The project area is underlain by a shallow groundwater zone with a water table less than 50 feet below the ground surface (CCFDC 2004). Generally, all shallow groundwater in the valley flows to the southeast and discharges to Las Vegas Wash and its tributaries. Based upon analysis of wells in the project area, water levels in this area range from 5 to 46 feet below the ground surface (SNWA 2002). Seasonal fluctuations in groundwater levels have been observed, with the highest water levels during winter and the lowest levels in summer due to evapotranspiration and irrigation.

Water quality in the shallow groundwater zone is relatively poor due to infiltration of irrigation waters and surface runoff containing fertilizers, organics and other contaminants (CCFDC 2004). High levels salinity (>8,000 mg/L) have been observed in the vicinity of Las Vegas Wash.

3.10 HEALTH, SAFETY, AND NOISE

3.10.1 Electric and Magnetic Fields (EMF)

Electric and magnetic fields are phenomena that occur both naturally and as a result of human activity. Naturally occurring electric and magnetic fields are caused by the weather and the earth's geomagnetic field. The fields caused by human activity result from communications, appliances, and the generation, transmission, and distribution of electricity.

Electric fields from power lines are directly dependent on the line voltage, and the field strength is reduced as the distance from the source increases. Electric fields are reduced at many receptors because they are effectively shielded by most objects or materials such as trees, houses, concrete and other building materials. Thus, the electric field is effectively shielded in residences in proximity to power lines or substations. At reasonably close distances, electric fields can cause static electricity. Magnetic fields are created when current flows through power lines and the strengths are determined mainly by line current, line height, and distance. Electrical transmission and distribution systems are not the only sources of magnetic fields. Local sources of magnetic fields in homes and workplaces include electric wiring and appliances.

The electrical effects of transmission lines are those related to electric fields, magnetic fields, and corona. Electric and magnetic fields are associated with induced voltages and currents on conductive objects near transmission lines. Electric and magnetic fields can also interfere with computer monitors, cardiac pacemakers, and defibrillators. At close range, corona discharges can generate audible noise (crackle) and interference with radio and television signals. Corona problems are generally not associated with 230kV transmission lines. Design considerations for conductor diameters, bundle diameters, and phase spacing on 500kV transmission lines are sufficient to control corona activity.

Some studies have reported a weak association between residential magnetic field exposure and certain types of childhood cancer. These studies have not demonstrated or concluded that the exposure to magnetic fields from transmission lines causes cancer. Other studies on workers have found associations between magnetic field exposure and some forms of cancer, but these results have been highly inconsistent. Laboratory experiments have shown that exposure to levels typically well above those normally found in residences can produce biological responses in cells, but there is little or no evidence that these changes constitute a health risk. EMF associated with high voltage transmission lines and electric generating plants can produce electric and magnetic fields that are potentially strong enough to cause the malfunction of some models of pacemakers and defibrillators. The magnetic field values for both 500kV and 230kV transmission lines would not exceed thresholds established by the American Conference of Governmental Industrial Hygienists, and therefore do not pose a potential impact for wearers of pacemakers and defibrillators.

3.10.2 Hazardous Materials

Project Area Overview

Existing and past land use activities are potential indicators of hazardous material storage and use. Industrial sites can have contaminated soil or groundwater, and other hazardous materials sources include leaking underground tanks, surface runoff from contaminated sites, and migration of contaminated groundwater plumes. Lands within the study area utilized for a variety of uses including open space recreation and preserve, residential housing, recreational, and commercial businesses. These lands have been subject to unauthorized disposal of garbage, construction debris, motor oil, dirt

and rocks, yard waste, tires, and sewage. Additionally, there are underground storage tanks in the vicinity of the proposed project that could have contributed to contamination. A limited review of environmental databases was conducted to identify known hazardous waste sites within or in the vicinity of the 500kV alternative corridors and 230kV transmission line corridors.

Environmental Databases Reviewed

Phase I Environmental Site Assessments

Two Phase I environmental site assessments (ESAs) have been conducted in the vicinity of the study area. The first ESA was prepared by Ninyo and Moore (2004) for the proposed Systems Conveyance and Operations Program (SCOP). The second, a modified Phase I ESA, was completed in association with the Las Vegas Valley Disposal Boundary Environmental Impact Statement (BLM 2005).

Environmental Databases

The Environmental Protection Agency (EPA) and Nevada Division of Environmental Protection (NDEP) databases were reviewed in July 2007 to compliment the findings of the 2004 PIESA. The EPA National Priority List (NPL) and Comprehensive Environmental Response, Compensation, and Liability Information Systems (CERCLIS) list were reviewed. The NDEP Registered Underground Storage Tank (UST) and Leaking UST lists were also reviewed.

The NPL list contains information about the most dangerous sites of uncontrolled or hazardous waste that requires cleanup, and is also known as the Superfund sites list. No listed or proposed NPL sites were noted within one mile of the proposed transmission line routes (EPA 2007). CERCLIS contains data on potentially hazardous waste sites that have been reported to the EPA by states, municipalities, private companies, and private persons. CERCLIS contains sites that are either proposed to be or are on the NPL and sites which are in the screening and assessment phase for possible inclusion on the NPL. A geographic search for CERCLIS sites in the Project area was performed on the EPA website (EPA 2007a) by entering in the zip codes within the study area (Figure 3.10-1). These zip codes included 89142, 89011, 89122, and 89015.

A total of four sites were identified in the general vicinity (Table 3.10-1). No CERCLIS sites were displayed in the 89011 or 89142 zip codes. One site, Fiestives Manufacturing located at 6430 McGill Avenue, was identified in the 89122 zip code area.

Table 3.10-1 CERCLIS Sites Identified on the EPA Website

Zip Code	CERCLIS ID	Site Name	Address
89122	NVN000905935	Fiestives Manufacturing	6430 McGill – Whitney Las Vegas, NV 89122
89015	NVD074150798	Basic Management, Inc.	Lake Mead Drive BMI Complex Henderson, NV 89015
89015	NV5141190608	Henderson Lead Contamination Soil Site	T21S, R63E, SEC 26, 27, 34, 35, -5 Mi. E of Henderson, NV 89015
89015	NVD062081500	Stauffer Chemical Company,	Lake Mead Drive Henderson, NV 89015

The NDEP Registered Underground Storage Tank list (NDEP 2007) identifies 197 registered underground storage tanks in Clark County. Zip codes were used as a method of narrowing the data

provided by NDEP. Most of these USTs identified on the NDEP list are not in close proximity to the alternative 500kV transmission line corridors or 230kV transmission lines.

The NDEP Leaking Underground Storage Tank (LUST) list (NDEP 2007a) identifies 273 active cases in Clark County since 2006. Petroleum contamination resulting from surface spills or leaking USTs may be found in the project area. However, petroleum contamination is less likely in undeveloped areas.

Recognized Environmental Conditions

Recognized Environmental Conditions (RECs) are defined by the American Society for Testing and Materials (ASTM) as “the presence or likely presence of any hazardous substance or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.”

The SCOP ESA found no evidence of hazardous materials or past spills in the area, but did identify three RECs: the Three Kids Mine Site; the Henderson Landfill; and a known perchlorate groundwater plume (Figure 3.10-1). The Three Kids Mine Site is located in the River Mountains west of Lake Mead and south of Lake Mead parkway. Manganese was mined from the site from 1917 to 1961. The area is known to have metal and petroleum contamination from the historical mining operations. Site investigation activities have occurred at the site, but no remedial actions have been performed.

The Henderson Landfill located west of Calico Hills and north of Lake Mead Parkway, has known metal contamination. Land use in the area is deed-restricted, with no residential development or water supply well construction allowed.

A known perchlorate groundwater plume, originating from the BMI Complex, has migrated in a northeasterly direction and enters the Las Vegas Wash in the vicinity of Pabco Road. The source of the perchlorate was traced to Kerr-McGee Chemical Corporation and American Pacific Corporation facilities. A groundwater interception system has been installed to intercept and treat the contaminated groundwater. Treated groundwater is returned to the Las Vegas Wash.

Figure 3.10-1 CERCLIS Site / Recognized Environmental Condition Map
See CD

3.10.3 Noise

Introduction

Noise levels are usually related to the intensity of nearby human activity. Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Noise levels in residential areas are generally 50-60 dBA, while levels of 75 dBA are typical of busy urban areas and levels up to 85 dBA occur near major freeways and airports. Although people often accept noise levels in noisy urban residential and residential-commercial zones, these levels are considered to be adverse to public health. Noise levels above 45 dBA at night can result in the onset of sleep interference. At 70 dBA, sleep interference effects become considerable. Typical noise levels are presented in Table 3.10-2.

Table 3.10-2 Typical Noise Levels (dBA)

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet-fly over at 1,000 feet	110	Rock band at 16 feet
Gas lawn mower at 3 feet	100	Inside subway train
Diesel Truck at 50 feet at 50 mph	90	Food Blender/Garbage Disposal at 3 feet
Noisy urban daytime	80	Shouting at 3 feet
Gas lawn mower at 100 feet	70	Vacuum cleaner at 10 feet
Heavy traffic at 300 feet	60	Normal speech at 3 feet
Quiet urban daytime	50	Dishwasher
Quiet urban nighttime	40	Small theater/Large conference room
Quiet suburban nighttime	30	Library/Bedroom at night, concert hall (background)
Quiet rural nighttime	20	Broadcast/Recording studio (background)
Lowest threshold of human hearing	10	Lowest threshold of human hearing

Source: Caltrans 1998

Existing Conditions

A wide range of noise sources occur in the project area due to the variety of land uses in the area. Ambient noise levels are lowest in the open, undeveloped areas and away from the highways and industrial or commercial activities. Primary sources of noise in the project area include automobile traffic, heavy machinery and construction equipment, recreational activities (e.g., OHV use), aircraft, and natural sources such as wind, rain, and thunder.

The existing transmission lines and substations within the study area are also sources of noise. Audible Noise (AN) associated with corona discharge from transmission lines is characterized by crackling, frying, hissing, sputtering and humming noise, and primarily occurs during bad weather conditions. Substation transformers are also sources of noise, primarily a hum that emanates from the transformer core.

Sensitive Receptors

Sensitive noise receptors are, in general, those areas of human habitation or substantial use where the intrusion of noise has the potential to adversely impact the occupancy, use, or enjoyment of the environment. These include residences, schools, religious institutions, hospitals, parks and other outdoor recreation areas, and places of business requiring low levels of noise.

Applicable Regulations, Plans, and Standards

Policies regarding noise exist at the federal, state, and local levels.

3.11 SOCIOECONOMICS

3.11.1 Introduction

Socioeconomic data for the project area were obtained from several sources, including the U.S. Department of Commerce-Bureau of the Census (Census 2007), Clark County Department of Comprehensive Planning (CCCP 2007), and the UNLV-Center for Business and Economic Research (CBER 2007). Demographic and economic data were collected at the state, county, and local levels. Census tract level data were also utilized, but these data have not been updated since the Census conducted in 2000 by the Bureau of the Census. Since some portions of the proposed transmission line corridors are parallel and adjacent to census tract boundaries, the adjacent tracts have been included in this discussion. Specifically, census tracts within the project area include 49.22, 54.11, 54.31, and 61.01. Adjacent tracts include 50.08 and 50.09. It should be noted that although the data from the 2000 Census does not reflect recent development in the northwestern portion of the study area, the existing data is still representative of the overall demographic and economic conditions in the project area.

3.11.2 Demographics

Clark County and the Las Vegas Metropolitan Statistical Area (MSA) have experienced tremendous population growth over the past several decades. This growth trend has continued since the last census. Population growth between 2000 and 2006 was 39% for Clark County and 18% for the Las Vegas MSA. There has been substantial residential development in the northwest portion of the study area over the past four years. Specifically, several residential developments have been constructed near the intersection of Hollywood Boulevard and Vegas Valley Road and Sahara Avenue. As previously noted, new developments are not reflected in the census tract data.

Table 3.11-1 provides a summary of selected socioeconomic characteristics for the state, county, MSA, and project area (census tract data). This data indicates that the populations at the state, county, and MSA levels had similar proportions of non-white residents (37.3%). The data revealed substantial variation in the proportion of non-white residents in individual census tracts, although the overall average for all census tracts in the vicinity of the project area was lower than the state, county, and MSA levels (Table 3.11-1). Census tracts 49.22 and 50.08 had higher proportions of non-white residents (average of 42.4%). These tracts are both located in the northwestern portion of the project area. Specifically, tract 49.22 is located that is bounded by Tree Line Road to the east, Vegas Valley Drive to the south, Sloan Lane to the west, and Sahara Avenue to the north. Tract 50.08 is bounded by Flamingo Arroyo to the east, Flamingo Road to the south, Sloan Lane to the west, and Vegas Valley Drive to the north. The remaining tracts were primarily white (average of 77.9%).

Table 3.11-1 Selected Characteristics from Year 2000 Census Data

	State of Nevada	Clark County	Las Vegas MSA	Tract 49.22	Tract 50.08	Tract 50.09	Tract 54.11	Tract 54.31	Tract 61.01	Census Tract Cumulative
Demographics										
Total Population	1,998,257	1,375,765	1,563,282	4,973	3,097	3,686	4,865	4,353	1,897	22,871
Percent White	65.1%	60.1%	63.0%	56.1%	59.1%	75.5%	76.8%	82.7%	76.8%	71.2%
Percent Non-White	34.9%	39.9%	37.0%	43.9%	40.9%	24.5%	23.2%	17.3%	23.2%	28.8%
Economics										
Unemployment Rate	4.0%	4.1%	4.2%	4.0%	6.7%	4.4%	2.9%	3.7%	0.6%	3.7%
Median Household Income	\$44,581	\$44,616	\$44,317	\$59,219	\$32,188	\$41,451	\$55,763	\$66,356	\$89,497	\$57,412
Median Per Capita Income	\$21,989	\$21,785	\$21,697	\$19,519	\$17,258	\$18,444	\$29,829	\$25,997	\$39,957	\$25,167
Percent of Families Below Poverty	7.5%	7.9%	7.8%	1.2%	8.2%	1.1%	1.7%	0.5%	3.4%	2.7%

3.11.3 Economics

Data from Clark County Comprehensive Planning indicates that the county economy is dominated by the leisure, hospitality, and gaming industries (Table 3.11-2). These industries represent the employment base for residents living within or in the vicinity of the project area. Economic statistics from the 2000 census were extremely similar for the State of Nevada, Clark County, and the Las Vegas MSA.

Table 3.11-2 Clark County Labor Market as of October 2006

Job Type	Number of Workers	Percent of Total
Leisure & Hospitality	274,000	22.02%
Casino Hotels & Gaming Industries	179,900	14.46%
Trade, Transportation & Utilities	158,900	12.77%
Professional & Business Services	117,300	9.43%
Construction	116,100	9.33%
Retail	100,200	8.05%
Government	95,100	7.64%
Education & Health Services	60,900	4.90%
Financial Activities	52,800	4.24%
Manufacturing	26,800	2.15%
Other Services	26,500	2.13%
Wholesale	24,000	1.93%
Information / Telecommunications	11,200	0.90%
Natural Resources & Mining	400	0.03%
TOTAL	1,244,100	100.00%

3.11.4 Environmental Justice

Executive Order 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) directs federal agencies to determine whether their programs, policies, and activities have disproportionately high and adverse human health or environmental effects on minority and low-income populations. Population and income data were collected from the State of

Nevada, Clark County, and the Las Vegas MSA. These data were then compared to comparable data for the census tracts within and adjacent to the project area (Table 3.11-1).

Generally, the population in the vicinity of the project area includes a smaller proportion of minorities compared to the state, county, and MSA populations (Table 3.11-1). Although minority populations occur in all census tracts, the demographic profile of the populations within each census tract is predominantly white. As previously noted, two census tracts northwestern portion of the project area (49.22 and 50.08) had slightly higher proportions of non-white residents compared to the state and regional populations.

Economic data indicates that the project area generally had lower rates of unemployment and poverty and higher income levels relative to the state, county, and MSA (Table 3.11-1). There is significant variability in economic indicators across the census tracts. Tract 50.08 had higher unemployment and poverty and lower income compared to the other census tracts. In contrast, tract 61.01 had lower unemployment and significantly higher income levels. In all census tracts except for one (50.08), the proportion of families living below the poverty level was lower than the State of Nevada, Clark County, and the Las Vegas MSA (Table 3.11-1). The poverty rate in Tract 50.08 was only 5.1% higher than the rate for the Las Vegas MSA.

3.11.5 Community Services (non-utility)

Police Protection

The Las Vegas Metropolitan Police Department and City of Henderson Police Department provide law enforcement services in the project area. Clark County Park Police is responsible for law enforcement in the county parks.

Fire Protection

The Clark County Fire Department and City of Henderson Fire Department provide fire services in the project area.

Medical Facilities

There are no hospitals or other medical facilities within or adjacent to the project area. A total of 16 hospitals, 14 emergency care centers, and seven hospices provide medical services in the Las Vegas Valley (Nevada Development Authority 2003).

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This section contains a discussion of potential impacts that would result from the construction, operation, and maintenance of the Proposed Action and alternatives. The basis for evaluating Project-related impacts was the Affected Environment as described in Chapter 3. The specific types, duration, and intensity of impacts that could occur as a result of the action alternatives are identified. The Project's contribution to global climate change was not assessed since greenhouse gas emissions would not result from operation and would be negligible for maintenance of the project. Project construction would result in greenhouse gas emissions (i.e., CO₂); however, emissions would be temporary and have a negligible impact on global climate change.

The specific location of transmission line structures and associated access roads cannot be determined until final design is complete. Estimates of permanent and temporary ground disturbance were calculated to help assess and compare the potential impacts of the Proposed Action alternatives upon specific resources. Disturbance estimates were based on design specifications for the 230kV and 500kV transmission lines (Chapter 2, Tables 2.4-1 and 2.4-2). Table 4.1-1 summarizes the ground disturbance estimates for the various Project components. These estimates would be recalculated for the Plan of Development (POD) when final design is complete and the precise locations of structures and roads are known.

Table 4.1-1 Ground Disturbance Estimates in Acres

Project Component	Temporary Disturbance	Permanent Disturbance	
		Structures	Access Roads
500kV Alternatives			
Alternative 1	93.3	10.4	8.2
Alternative 2	93.6	9.7	15.8
Alternative 3	82.6	9.7	11.2
Alternative 4 (Preferred)	100.9	10.1	8.0
230kV Lines			
Sunrise to Equestrian (LV #3)	81.7	5.1	5.4
Sunrise to Clark (LV #1)	45.2	2.5	0
Substations	0	0	0

4.1.1 Substations - Equestrian, Clark, Sunrise, Winterwood

Four existing NPC-owned substations, Equestrian, Clark, Sunrise, and Winterwood, would be modified to support the proposed 500kV and 230kV transmission lines. Construction activities at the four substations would occur within the existing substation sites entirely within previously disturbed areas (graded and vegetation removed) as a result of substation construction and operation. Modifications would not require acquisition of additional lands. As a result, the substation modifications associated with the Sunrise Tap Transmission Line Project would have minimal environmental impacts. Given the location and nature of the substation modifications, and the absence of any measurable effects on biological, cultural, paleontological, and topography, geology, and soils resources, substation modifications are not addressed in these resource sections.

4.1.2 Sunrise–Clark (LV #1) 230kV Transmission Line

The Project includes rebuild of the existing Sunrise-Clark (LV #1) transmission line between the Sunrise and Clark Substations. The route is located in an urban area, and all work would occur entirely within the existing, previously disturbed NPC ROW. The route corridor does not contain unimpacted native plant communities and habitats. Given the location and nature of the transmission line rebuild, and the absence of any measurable effects on biological resources, the Sunrise-Clark (LV #1) transmission line is not addressed in this resource section.

4.1.3 138kV Transmission Lines

The Project includes the construction of quad-circuit 138kV transmission lines and double-circuit 138kV transmission lines between the Sunrise and Winterwood Substations (Chapter 2, Figure 2.4-4). The new 138kV transmission lines would replace approximately 4,500 feet of existing transmission lines within existing NPC ROW through a trailer park and along Sahara Ave. The new structures would replace the old structures in approximately the same location and would only be slightly taller than the existing structures. Structure diameters and span lengths would be similar. Given the location and nature of the transmission line rebuild and the absence of any measurable effects on environmental and human resources, the 138kV transmission lines are not addressed in the resource sections.

4.2 LAND USE, RECREATION, AND TRANSPORTATION

4.2.1 Introduction

This section describes potential impacts to land use, recreation, and transportation as a result of construction, operation, and maintenance of the Sunrise Tap Transmission Line Project.

The 230kV and 500kV transmission lines may result in short-term impacts from conflicts with existing land uses and disruption to the community associated with dust, noise, public health, traffic, and visual quality. Long-term impacts may result from precluding and/or conflicting with existing land uses within or adjacent to the transmission line ROWs. Where applicable, mitigation measures in Chapter 2, Table 2.4-4 would be implemented to reduce impacts.

4.2.2 Methods

Land use, recreation, and transportation impacts were determined using information from planning documents, communications with federal, state, and local agencies, field reconnaissance, GIS data, and aerial photography.

Land use impacts as a result of the Project would be considered significant if impacts would:

- Divide the physical arrangement of an established community;
- Preclude a permitted use or create a disturbance to a particular land use; or
- Substantially conflict with an established or planned land use.

Recreation impacts as a result of the Project would be considered significant if impacts would:

- Result in substantial loss, destruction, or degradation of federal, state, local, or private recreational resources; or
- Restrict access to federal, state, local, or private recreational sites or restrict access to public land.

Transportation impacts as a result of the Project would be considered significant if impacts would:

- Cause permanent closure of roads to through traffic or reduction of travel lanes;
- Reduce service to vicinity roads to an unacceptable level;
- Restrict access to properties;
- Restrict the movements of emergency vehicles;
- Disrupt bus transit service;
- Impede pedestrian movements or bike paths;
- Conflict with planned transportation projects; or
- Cause noticeable deterioration of road surfaces.

4.2.3 Impacts and Mitigation Measures

Substations - Equestrian, Clark, Sunrise, Winterwood

Substation modifications would occur within the existing boundary and fence line (property) of the existing substations as described in Section 4.1.1 and would not interfere physically with surrounding developments or land uses. Land uses near the substations include residential and public roadways. Nearby residences could be potentially impacted by construction activities. Construction of substation modifications would temporarily disturb the surrounding areas as a result of heavy construction equipment and moving building materials to and from construction staging areas. Construction would result in short-term, minor impacts to land use from increased noise, dust, and access restrictions on nearby land uses. Construction worker commute trips and equipment and material deliveries would slightly increase existing traffic volumes in the project area; however, the slight temporary increase in traffic would not result in disruption of established land uses near these substations.

230kV Transmission Lines - Sunrise-Clark (LV #1) and Sunrise-Equestrian (LV #3)

The proposed 230kV transmission lines would result in both short-term and long-term land use impacts. Short-term impacts which would occur as a result of transmission line construction include direct conflicts with existing land uses and disruption to the community associated with dust, noise, public health, traffic, and visual quality. Long-term impacts would result from precluding and/or conflicting with existing land uses within or adjacent to the transmission line ROW. The following summarizes land uses that would be affected by the proposed 230kV transmission lines. Impact discussion is common to both 230kV transmission lines, unless otherwise noted.

Land Use

The 230kV transmission line routes would traverse or run adjacent to a range of land use types, including residential, commercial, industrial, public facilities and utilities, transportation, and parks and recreation/open space. Construction of the 230kV transmission lines would temporarily disturb the surrounding areas as a result of heavy construction equipment on temporary and permanent access roads and the movement of building materials to sites and returning to construction staging areas.

Although a major linear facility such as a transmission line has the potential to physically divide a community, the majority of the proposed 230kV transmission lines would be located within existing established transmission corridors and would not result in further physical division of the nearby communities as a result of long-term physical or visual barriers. Although structures

would be present, movement between and around these facilities would be possible and would not block or impede travel or connections within the community. As such, no land use impacts relating to the division of an established community would occur, and no mitigation would be required.

During 230kV transmission line construction, temporary traffic, noise, and air quality impacts may occur to residents located adjacent to the transmission line routes. As identified in Chapter 3, residential developments adjacent to the Sunrise-Equestrian 230kV transmission line route include the City of Henderson Foothills Planning Area, Glassburn-Corn Subdivision, Palm City, Tuscany, Weston Hills, Desert Hill Master Planned Community (Desert Inn Master Plan), Stallion Mountain Estates 2, The Enclave at Stallion Mountain, Sunrise Meadows, Sahara Summit, and Sahara Sunrise. Residential developments adjacent to the Sunrise-Clark 230kV transmission line route include apartments, mobile home parks, and single family residences. Specific developments include Sunrise Meadows, Sahara Summit, Sahara Sunrise, Vegas Valley and Sloan, Stallion Mountain Estates 2, Stallion Mountain, The Enclave at Stallion Mountain, Rose Garden Estates, Barry Acres, Kisling Gardens, Unrecorded Whitney Tract, Nevada Estates, Wexford at Canyon Springs, Villas at Tropicana 2, Canyon Willow East, Monterey Gardens No. 1, and Bunch Tract No. 2.

The 230kV transmission lines proposed for rebuild are within existing utility ROWs. The ROWs currently cross a number of roads used as primary access to residential development adjacent to the utility corridor. Construction activities along these roads (i.e., removal of existing structures and conductors, construction of new structures and stringing of new conductors) would create increased traffic and short-term delays for residents as they enter and exit their neighborhoods. Noise, dust, and construction equipment associated with erecting new transmission lines may also disrupt business operations. Implementation of mitigation measures LMM-1 and LMM-2 described in Chapter 2, Table 2.4-4 would minimize these impacts. These mitigation measures would serve to limit the hours of construction, minimize noise levels, and provide advanced notice of potentially disruptive activities to nearby residences and businesses.

In addition, the transmission lines may disrupt activities associated with public wastewater treatment plants and floodway channels. The Sunrise-Equestrian 230kV transmission line route would traverse or run adjacent to the City of Las Vegas WPCF, Clark County CP/AWT facility, and Las Vegas Wash Flood Control Channel. The Sunrise-Clark 230kV transmission line route would traverse or run adjacent to the Clark County CP/AWT facility, Las Vegas Flood Control Channel, and Duck Creek Flood Control Channel. To minimize potential impacts on the operation of these facilities, mitigation measures LMM-2 and LMM-3 described in Chapter 2, Table 2.4-4 would be implemented to minimize impacts.

The 230kV transmission lines would traverse or be located adjacent to existing Reclamation and BLM land use authorizations. These are primarily in the form of ROWs for other electrical lines, roads, telephone lines, water facilities, recreation or public purpose leases, and material sites for road construction. In most cases, the Project would cross or parallel the existing ROWs with little or no interference. Specific locations of structures would be designed to avoid these land use authorizations by spanning them with adequate distance between structures. This would reduce potential safety issues with crossing gas pipelines, or material sites. NPC would properly ground fences that cross the ROW per NPC engineering construction standards in order to minimize potential electrical induction situations. For these reasons, no impacts to Reclamation or BLM land use authorizations are anticipated.

Recreation

The 230kV transmission lines could result in or accelerate the physical deterioration of recreational facilities if they increased use of these facilities beyond existing capacity. Generally, this increased use is a result of an increase in population local to the recreational resource. The 230kV transmission lines would not induce either short-term or long-term population growth, and are unlikely to draw additional residents or recreationists to the area. Therefore, the transmission lines would not increase local need for recreational resources, and would not lead to the physical deterioration of recreational facilities due to increased use.

During construction, disruption of recreational activities could occur through blocking of entrances to parks, dispersed recreational areas, golf courses, OHV routes, or trails by construction activities or equipment. The Sunrise-Equestrian 230kV transmission line route would traverse the Clark County Wetlands Park, Royal Links Golf Club, Stallion Mountain Country Club, and Tuscany Golf Club. The Sunrise-Clark 230kV transmission line route would traverse the Royal Links Golf Club, Stallion Mountain Country Club, and run adjacent to Horseman's Park and Dog Fancier's Park. It may be necessary to divert traffic around parks, roads and trails during limited times during construction. Construction related activities may temporarily close or block access to these recreational facilities. Mitigation measure RMM-1 described in Chapter 2, Table 2.4-4 would be implemented to identify appropriate construction schedules, signage, and areas that would require restricted access to minimize impacts.

Transportation

Construction activities may result in temporary road or travel lane closures, especially during transmission line stringing activities. There is also a possibility that traffic detours or implementation of controlled continuous traffic breaks may be required at these road crossing locations. NPC would obtain encroachment permits or similar authorizations from applicable jurisdictions when streets are used for more than normal traffic purposes, or where a traffic control plan is required. Mitigation measure TMM-1 described in Chapter 2, Table 2.4-4 would be implemented to ensure that impacts associated with short-term lane and road closures during transmission line construction would be minimized.

Construction activities would generate additional traffic on regional and local roadways. Construction worker commute trips, Project equipment deliveries, and hauling materials such as support structures, concrete, conductor, and excavation spoils would increase existing traffic volumes in the Project area. The Project-related commute traffic and construction truck/equipment activity is expected to be dispersed over the entire Project area and dispersed over time during different construction phases. To ensure that Project-related construction traffic does not contribute to unacceptable levels of service on area roadways, mitigation measure TMM-1 described in Chapter 2, Table 2.4-4 would be implemented. This measure would minimize potential impacts from construction traffic.

Construction activities would not restrict access to driveways or otherwise affect access and parking for adjacent residences, institutions, businesses, and other uses. The Project would not include any trenching or other excavation in road ROWs that would impede access to adjacent uses. Therefore, there would be no impact associated with restricted access to properties.

Construction activities could potentially interfere with emergency response by ambulance, fire, paramedic, and police vehicles. The temporary road or lane closures that would be required during stringing activities could lengthen the response time required for emergency vehicles

passing through the construction zone. Mitigation measure TMM-1 includes measures to minimize potential impacts from construction activities on emergency response.

Stringing activities that would require short-term road or lane closures associated with construction of the transmission line may disrupt transit bus routes and local school bus routes. Potential impacts could include scheduling delays and temporary bus reroutes. Implementation of mitigation measure TMM-1 would minimize impacts to public and school bus routes.

Construction activities could impact pedestrian and bicycle circulation by temporarily blocking established pedestrian and bicycle routes where the transmission line would cross these designated paths. Mitigation measure TMM-1 would minimize potential impacts to pedestrian movements and bike paths.

The transmission line routes could cross a planned transportation project. Mitigation measure TMM-1 would minimize potential impacts related to conflict with planned transportation projects.

Physical damage to roads, sidewalks, medians, etc., is not expected as a result of the Project; however, there is the potential for unexpected damage to occur due to the operation of construction vehicles and equipment. Mitigation measure TMM-2 described in Chapter 2, Table 2.4-4 would minimize potential impacts related to damaged road ROWs.

500kV Transmission Line

The 500kV transmission line alternative routes could result in both short-term and long-term land use impacts. Short-term impacts as a result of transmission line construction include direct conflicts with existing land uses and disruption to the community associated with dust, noise, public health, traffic, and visual quality. Long-term impacts could result from precluding and/or conflicting with existing and/or planned land uses within the transmission line ROW. The following summarizes land uses that would be potentially affected by the 500kV transmission line alternative routes. Impact discussions are the same for all four 500kV transmission line alternatives.

Land Use

The 500kV transmission line alternative routes would traverse or adjoin land used for residential, industrial, public facilities and utilities, transportation, and parks and recreation/open space purposes. Construction of the 500kV transmission line alternatives would temporarily disturb the surrounding areas as a result of heavy construction equipment on temporary and permanent access roads and the movement of building materials to sites and returning to construction staging areas. From an operational perspective, the 500kV transmission line would not require the removal of any residences along the proposed route.

While a major linear utility such as a transmission line has the potential to physically divide a community, the transmission line is located for the most part outside of community areas. Where alternatives are located in community areas, they parallel existing transportation or flood control channels (Las Vegas Wash) and would therefore not further divide an established community. In addition, the 500kV transmission line alternatives would not establish a permanent barrier or obstacle between uses such that a perceived physical division would occur. While structures and lines would be present, travel or connections within the community would not be impeded so as to create a divide. As such, no land use impacts relating to the division of an established community would occur, and no mitigation would be required.

During 500kV transmission line construction, temporary traffic, noise, and air quality impacts would occur to residents located adjacent to the alternative routes. As identified in Chapter 3, residential uses adjacent to the 500kV transmission line alternative routes include Lake Las Vegas, Desert Inn Master Planned Community (Desert Inn Master Plan), Riverwalk, Sunrise Meadows, Sahara Summit, and Sahara Sunrise. A discussion of noise and air quality impacts can be found in Section 4.10 Health, Safety and Noise and Section 4.7 Air Quality.

The routes currently cross roads used as primary access to residential developments. Construction activities along these roads (i.e., erection of structures and stringing of conductors) would create increased traffic and short-term delays for residents as they enter and exit their neighborhoods. Noise, dust, and construction equipment associated with erecting new transmission lines could also disrupt business operations. Implementation of mitigation measures LMM-1 and LMM-2 described in Chapter 2, Table 2.4-4 would reduce impacts by limiting hours of construction, minimizing noise levels, and providing advanced notice of potentially disruptive activities to nearby residences and businesses.

In addition, the transmission lines could disrupt activities associated with public wastewater treatment plants (City of Las Vegas WPCF and Clark County CP/AWT facility). To minimize potential impacts with the operation of these facilities, mitigation measures LMM-2 and LMM-3 described in Table 2.4-4 would be implemented.

Construction of the 500kV transmission line alternatives would involve installation of new transmission structures. Installation of the new structures would permanently disturb land at each structure location. Established land uses such as Manheim's Greater Las Vegas Auto Auction's parking/storage area would be permanently displaced by the structures.

The 500kV transmission line alternatives would cross BLM land which has been identified as a potential affordable housing site. The land is located east of Hollywood Boulevard and south of Vegas Valley Drive (Figure 3.2-1). Clark County is currently determining the development potential of this land.

The 500kV transmission line alternative routes would traverse or be located adjacent to existing Reclamation and BLM land use authorizations. These are primarily in the form of ROWs for other electrical lines, roads, telephone lines, water facilities, recreation or public purpose leases, and material sites for road construction. In most cases, the Project would cross over or parallel the existing ROWs with little or no interference. Specific locations of structures would be designed to avoid these land use authorizations by spanning them with adequate distance between structures. This would reduce potential safety issues with crossing gas pipelines, or material sites. NPC would properly ground fences that cross the ROW per NPC engineering construction standards in order to minimize potential electrical induction situations. For these reasons, no adverse impacts to Reclamation or BLM land use authorizations are anticipated.

Portions of the Project would extend outside of BLM designated utility corridors (within the Rainbow Gardens and River Mountains ACECs). According to the BLM Las Vegas Field Office Record of Decision for the Approved Las Vegas Resource Management Plan and Final Environmental Impact Statement (October 1998), the ACECs are designated as ROW avoidance areas except within corridors. With some exceptions; however, all public land within the Field Office's planning area is available at the discretion of the agency for ROWs under the authority of the Federal Land Policy and Management Act (FLPMA).

Recreation

The 500kV transmission line alternatives may result in or accelerate the physical deterioration of recreational facilities if they increased use of these facilities beyond existing capacity. Generally, this increased use is a result of an increase in population local to the recreational resources. The 500kV transmission line alternatives are not expected to induce either short-term or long-term population growth, and are unlikely to draw additional residents or recreationists to the area. Therefore, the 500kV transmission line would not increase local need for recreational resources, and would not lead to the physical deterioration of recreational facilities due to increased use.

During construction, disruption of recreational activities could occur through the physical restriction of access to parks (Clark County Wetlands Park), dispersed recreational areas, OHV routes, or trails by construction activities or equipment. It may be necessary to temporarily divert traffic around parks, roads, and trails during construction. Construction-related activities may temporarily close or block access to these recreational facilities. Mitigation measure RMM-1 described in Table 2.4-4 would be implemented to identify appropriate construction schedules, signage, and areas that would require restricted access.

The creation of new roads could allow unauthorized users to access new areas of the BLM Rainbow Gardens ACEC. This could contribute to resource damage or degradation. Consequently, the construction of new access/spur roads associated with the 500kV transmission line may contribute to unmanaged recreation (e.g., illegal OHV use), resulting in potential impacts to the ACEC. Mitigation measure RMM-2 described in Table 2.4-4 would minimize illegal OHV use along non-BLM roads, thereby reducing impacts from unmanaged recreation.

Transportation

Construction activities could result in temporary road or travel lane closures, especially during transmission line stringing activities. There is also a possibility that traffic detours or implementation of controlled continuous traffic breaks may be required at road crossing locations. NPC would obtain encroachment permits or similar authorizations from applicable jurisdictions when streets are used for more than normal traffic purposes, or where a traffic control plan is required. Mitigation measure TMM-1 would ensure that potential impacts associated with short-term lane and road closures during transmission line construction would be minimized.

Construction activities would generate additional traffic on regional and local roadways. Construction worker commute trips, Project equipment deliveries, and hauling materials such as support structures, concrete, conductors, and excavation spoils would increase existing traffic volumes in the Project area. The Project-related commuter traffic and construction truck/equipment activity is expected to be dispersed over the entire Project area and dispersed over time during different construction phases.

To ensure that Project-related construction traffic does not contribute to unacceptable levels of service on area roadways, mitigation measure TMM-1 would be implemented. This measure would ensure that potential impacts from construction traffic to roadway congestion are minimized.

Construction activities would not restrict access to driveways or otherwise affect access and parking for adjacent residences, institutions, businesses, and other uses. The Project would not include any trenching or other excavation in road ROWs that would impede access to adjacent uses. Therefore, there would be no impact associated with restricted access to properties.

Construction activities could potentially interfere with emergency response by ambulance, fire, paramedic, and police vehicles. Temporary road closures that may be required during stringing activities could lengthen the response time required for emergency vehicles passing through the construction zone. Mitigation measure TMM-1 would minimize potential impacts from construction activities on emergency response.

Stringing activities that would require short-term road closures associated with construction of the transmission line could disrupt transit bus routes and local school bus routes. Potential impacts could include scheduling delays and temporary bus reroutes. Mitigation measure TMM-1 would minimize potential impacts to public and school bus routes.

Construction activities could impact pedestrian and bicycle circulation by temporarily blocking established pedestrian and bicycle routes where the transmission line would cross these designated paths. Mitigation measure TMM-1 would be implemented to minimize impacts to pedestrian movements and bike paths.

The transmission line routes could cross a planned transportation project. Mitigation measure TMM-1 would minimize potential impacts related to conflict with planned transportation projects.

Physical damage to roads, sidewalks, medians, etc., is not expected as a result of the Project; however, there is the potential for unexpected damage to occur due to the operation of construction vehicles and equipment. Mitigation measure TMM-2 described in Chapter 2, Table 2.4-4 would minimize potential impacts related to damaged road ROWs.

No Action Alternative

Under the No Action Alternative, the Project would not be constructed and there would be no direct impacts to land use, recreation, and transportation. However, adverse impacts to land use could result from inadequate power supply and reliability if the project need is not met. These impacts include inadequate power supply for businesses and homes.

4.3 VISUAL RESOURCES

4.3.1 Introduction

This section describes the potential scenic quality and viewer impacts that would result from the Sunrise Tap Transmission Line Project.

The primary viewer groups that would be most heavily impacted by the Project are residences and recreationists. Residences that would be most heavily impacted are primarily located on the west side of the 500kV alternatives, near South Hollywood Boulevard and East Desert Inn Road. Residences in the Lake Las Vegas, Tuscany, and Weston Hills developments would also be impacted at varying levels by the 500kV alternatives. Total high visual impacts to residences range from 6.0 miles to 6.6 miles for the 500kV alternatives. The highest impacts on visual resources from the 230kV rebuild lines occur in Henderson in the “Section 4” residential development, in the residential areas between Desert Inn Road and Flamingo Road, and in the residential area between Tropicana and East Sunset Road. Recreationists using the Wetlands Park complex would be impacted by both the 500kV and the 230kV transmission lines.

Impacts to visual resources from construction, maintenance, and decommissioning would typically be short-term in duration, while impacts from operation would be long-term in duration. Short-term and long-term impacts would be minimized through the implementation of mitigation measures described in Chapter 2, Table 2.4-4.

4.3.2 Methods

Visual impacts would result when visual changes created by the Project would affect viewsheds from sensitive viewpoints or change landscape scenic quality. Visual impacts resulting from the Project would be either short-term (temporary) or long-term (life of the Project). Short-term visual impacts would result from construction activities including temporary landscape disturbance in work areas, the blading of access roads that exposes underlying soils, the presence of materials and material staging areas, and the presence of construction workers and equipment. Long-term impacts would result from permanent disturbance associated with the presence of transmission line structures and vegetation clearing within the ROW.

This impact assessment considers:

- Views from residences
- Views from parks and recreation areas
- Views from sensitive travel routes and trails
- Effects on landscape scenic quality or visual integrity

Impacts on viewers are a function of sensitivity, contrast, and distance. The combination of these elements would determine initial impact levels. For example, impact levels would be considered high where the Project would be dominant or where strong contrasts would be seen from high sensitivity viewpoints in the immediate foreground/foreground/middleground distance zones. Impacts would be considered low where the Project contrasts would be weak, where viewers have a moderate or low sensitivity, and where views are in the middleground or background.

Landscape attractiveness is measured in terms of scenic quality or visual integrity. Scenic quality is used where the landscape is primarily natural in appearance and where development levels are low. Visual integrity is similar, but measures landscape attractiveness in areas dominated by development. Landscapes in the study area were assigned a Class A (Unique), Class B (Above Average), or Class C (Common) rating (Chapter 3). These ratings are determined by evaluating landscape features such as vegetation patterns, water features, landform diversity, color, and other factors that contribute or detract from perceived beauty. Impacts on scenic quality or visual integrity affect the inherent quality of the landscape regardless of how the landscape is seen by viewers. For example, low impacts would occur as a result of weak contrasts in Class B landscapes, or weak and moderate contrasts in Class C landscapes. Similarly, high impacts would occur in Class A landscapes where strong contrasts are predicted.

A Digital Elevation Model (DEM) was used to model visibility of the Project. Visibility of the transmission line was mapped based on 6-foot viewer height, 175-foot tall 500 kV lattice structures and 120-foot tall 230 kV single steel pole structures (Chapter 2). Vegetation and buildings are not included in the digital model. Initial impact levels were determined as a result of the raw visibility model and distance (or scenic quality/visual integrity). Final impact totals for each alternative, determined after impact modifiers were evaluated and applied (such as the presence of vegetation and structures, viewer orientation, sky-lining of the structures and lines, etc.) are summarized in Table 4.3-4 below.

In the Las Vegas regional landscape setting, visual contrast is expected to be created primarily by the introduction of transmission line structures (monopoles or lattice towers). Vegetation in the study area is sparse, and where it does occur in the more natural landscapes (outside of riparian areas), it is primarily low growing due to the desert ecosystem.

Landform contrasts created as a result of the 500kV and 230kV components also played a minor role in determining contrasts. Existing ROWs and roads would be used for all of the 230kV rebuild, and over most of the alignments for the 500kV alternatives. Therefore, monopole and lattice structures would have the overriding influence on contrasts created by the Project.

Structure contrast is determined primarily by whether or not transmission line structures presently exist near the proposed transmission lines. For the Sunrise Tap Transmission Line Project (Project), existing structure types were analyzed for similarity to the proposed structures and for the degree to which the existing corridors are modified by various transmission lines. Strong contrasts are created by the introduction of new transmission lines where none presently exist.

There are two types of proposed 500kV structures: 150-200' tall single steel pole double circuit structures and 150-200' tall double circuit lattice structures (Chapter 2). Similar lattice structures presently exist in the BLM utility corridor (Figure 3.3-2). The construction of new lattice towers near this corridor would cause weak contrasts transitioning to moderate and strong contrasts further away from the corridor. Visual contrasts for the 500kV transmission line were considered weak within the utility corridor. The new single steel pole structures proposed to be installed along South Hollywood Boulevard and the lattice structures in the Sunrise Management Area foothills/Las Vegas Wash would cause strong contrasts over most of the 500kV alternatives. However, many different transmission lines converge in and around the Sunrise Substation and contrasts would transition to a weak level there.

The existing LV #3 69kV line is typically constructed of H-frame pole structures, while the existing LV #1 69kV line is constructed of a mix of single wood or steel poles and H-frame pole structures. The proposed 90-120 foot single-steel pole structures would differ from the existing lines, but not substantially enough to cause strong contrasts. The 69kV lines are moderate to strong vertical and horizontally linear features in an urban landscape that is typically dominated by low-rise residential development and open space. Therefore, contrasts were considered moderate along the majority of the rebuild portion of the route. In the existing BLM designated utility corridor occupied by multiple 500kV lines, weak contrasts are expected as a result of the introduction of another, somewhat different parallel line.

Initial impacts on viewers were determined by combining contrasts with the visibility model. The resulting impact levels on moderate sensitivity and high sensitivity viewers are presented in Tables 4.3-1 and 4.3-2 below. Scenic quality/visual integrity initial impacts were determined by combining contrasts with classification presented in Tables 4.3-1, 4.3-2 and 4.3-3.

Table 4.3-1 High Sensitivity Viewer Initial Impact Matrix

		Visual Contrast (Structure)		
		Strong	Moderate	Weak
<i>Distance/Visibility Threshold</i>	<u>Immediate Foreground</u> 500kV : 0 – 1,000' 230kV: 0 – 500'	High	High	Moderate
	<u>Foreground</u> 500kV : 1,000' to 0.75 mile 230kV: 500' to 0.5 mile	High	Moderate	Low
	<u>Middleground</u> 500kV : 0.75 to 3.0 miles 230kV: 0.5 to 1.5 miles	Moderate	Moderate	Low
	<u>Background</u> 500kV : 3.0-miles + 230kV : 1.5-miles +	Moderate	Low	Low

Table 4.3-2 Moderate Sensitivity Viewer Initial Impact Matrix

		Visual Contrast (Structure)		
		Strong	Moderate	Weak
<i>Distance/Visibility Threshold</i>	<u>Immediate Foreground</u> 500kV : 0 – 1,000' 230kV: 0 – 500'	High	Moderate	Low
	<u>Foreground</u> 500kV : 1,000' to 0.75 mile 230kV: 500' to 0.5 mile	Moderate	Moderate	Low
	<u>Middleground</u> 500kV : 0.75 to 3.0 miles 230kV: 0.5 to 1.5 miles	Moderate	Low	Low
	<u>Background</u> 500kV : 3.0-miles + 230kV : 1.5-miles +	Low	Low	Low

Table 4.3-3 Scenic Quality Initial Impact Matrix

		Visual Contrast (Structure)		
		Strong	Moderate	Weak
<i>Scenic Quality/ Visual Integrity</i>	<i>Class A</i>	High	Moderate	Low
	<i>Class B</i>	Moderate	Moderate	Low
	<i>Class C</i>	Moderate	Low	Low

4.3.3 Impacts and Mitigation Measures

Impact modifiers were applied to the initial impact levels to determine final impacts. Residual impact levels are very similar to initial impacts because project-wide mitigation would be incorporated (reflected in initial impact levels), and viewing conditions are similar among the alternatives.

Two primary viewer groups would be most heavily impacted: residences and recreationists. Residences would be most heavily impacted primarily on the west side of the 500kV alternatives, where the project would be constructed close to residences located near South Hollywood Boulevard and East Desert Inn Road. Impacts on residences viewing the project from Lake Las Vegas, Tuscany, and Weston Hills would vary among 500kV alternatives.

Both the 500kV and 230kV transmission lines would impact viewers using the Wetlands Park complex. Other recreationists viewing from BLM trails and facilities, local parks and other areas are detailed below. For the 230kV rebuild lines, the highest impacts on visual resources would occur in Henderson in the “Section 4” Tuscany and Weston Hills residential developments.

For the 500kV alternatives, Alternative 3 would cause the lowest amount of residual visual impacts with a total of 6.0 miles of high impacts. The second ranking alternative for visual impacts is Alternative 2 and the third ranking alternative is Alternative 4. The highest visual impacts are expected from Alternative 1, with a total of 6.6 miles of high impacts. Contrast Rating Sheets document contrasts viewed from KOPs for the 500kV alternatives and are provided in Appendix A.

Visual simulations documenting expected changes from the 230kV and 500kV alternatives are provided in Figures 4.3-2a and 2b; Figures 4.3-3a, 3b, and 3c; Figures 4.3-4a, 4b, and 4c; Figures 4.3-5a and 5b; and Figures 4.3-6a and 6b. Figure 4.3-1 shows the locations of the KOPs from which the simulations were derived relative to the Project area.

Table 4.3-4 Visual Impact Summary of 500kV Alternatives

500kV Alternatives	Alternative 1	Alternative 2	Alternative 3	Alternative 4 (Preferred Alternative)
Total length of Alternative	7.36 miles	6.84 miles	6.88 miles	7.07 miles
Miles of VRM Class III Crossed	3.12 miles	1.85 miles	1.51 miles	1.51 miles
Miles crossing Class A Scenic Quality/ Visual Integrity	1.3 miles	0.8 miles	0.8 miles	0.7 miles
Miles crossing Class B Scenic Quality/Visual Integrity	3.9 miles	4.0 miles	4.0 miles	4.2 miles

500kV Alternatives	Alternative 1	Alternative 2	Alternative 3	Alternative 4 (Preferred Alternative)
Miles crossing High Visual Contrast	3.2 miles	4.7 miles	4.7 miles	4.8 miles
Miles crossing Moderate Visual Contrast	2.2 miles	2.2 miles	2.2 miles	2.2 miles
Miles of High Initial Impacts to scenic quality/visual integrity	1.1 miles	0.8 miles	0.8 miles	0.7 miles
Miles of Moderate Initial Impacts to scenic quality/visual integrity	4.0 miles	4.0 miles	4.0 miles	4.2 miles
Miles of High Initial Impacts to sensitive viewers	5.9 miles	6.7 miles	6.7 miles	6.8 miles
Mitigation Measures¹	VRMM-1, VRMM-2, VRMM-3, VRMM-4, VRMM-5, VRMM-6, VRMM-7, VRMM-8, VRMM-9, VRMM-10, VRMM-11, VRMM-12, VRMM-13			
Miles of High Residual Impacts	6.6 miles	6.1 miles	6.1 miles	6.2 miles
Miles of Moderate Residual Impacts	0.6 miles	0.9 miles	0.9 miles	0.9 miles
¹ Proposed mitigation measures are the same for all alternatives. See Chapter 2 Section 2.4.5 Mitigation Measures and Table 2.4-4 for descriptions of mitigation measures.				

Figure 4.3-1 Key Observation Points Map
See CD

Figures 4.3-2a & 4.3-2b KOP #6
See CD

Figures 4.3-3a & 4.3-3b
See CD

Figures 4.3-3a & 4.3-3c
See CD

Figures 4.3-4a & 4.3-4b KOP #5
See CD

Figures 4.3-4a & 4.3-4c KOP #5
See CD

Figures 4.3-5a & 4.3-5b KOP #7
See CD

Figures 4.3-6a & 4.3-6b KOP #8
See CD

Substations – Equestrian, Clark, Sunrise, Winterwood

Substation modifications would occur within the existing boundary and fence line (property) of the substations as described in Section 4.1.1. Due to the presence of existing substations and generating stations in the substation construction areas, visual impacts in these areas are expected to be minor.

230kV Transmission Lines – Sunrise-Clark (LV #1) and Sunrise-Equestrian (LV #3)

Residences located in “Section 4” would be impacted by the Sunrise-Equestrian 230kV transmission line. Residences currently have open views of the Las Vegas Valley to the west, although some are partially obstructed by the existing 69kV transmission line. Views from here would be affected as a result of contrasts created by the introduction of modified structures in the landscape. Also, residences would have their views towards the valley impeded by taller structures. The existing H-frame wood structures are about 45 to 55 feet tall, which are substantially shorter than the proposed structures. The presence of more massive and taller steel monopoles would make the transmission line corridor more noticeable to the casual viewer, and increase the dominance of the line in the landscape (Figure 4.3-2). The Sunrise-Equestrian 230kV transmission line would cause approximately 2.3 miles of high visual impacts and 8.8 miles of moderate impacts.

River Mountains Loop Trail generally follows the BLM designated utility corridor, and the new line portion of the Project would essentially follow the trail from Havre Avenue south. Impacts would be moderate to low primarily due to the fact that the landscape in this area is currently dominated by overhead high-voltage lines. Although the Project would be in the immediate foreground view, trail users in this area have low expectations for visual change in the landscape due to the overwhelming dominance of the existing structures within the corridor. Viewers oriented towards the valley would see the Project very close to the trail, and it would be viewed only as individual poles for a short duration.

The rebuild portion of the line traverses the Tuscany development through the golf course. The existing line is similar, but smaller in scale to the replacement structures. Additional conductor wires would be present in the viewshed, but would not substantially degrade views in the existing ROW.

Views of the rebuilt line from the Clark County Wetlands Park area would be both in the immediate foreground and background. The existing line crosses numerous minor trails and Wetlands Park Scenic Drive. It is in view from the Sunrise Trailhead (Figure 4.3-1) as well as the Wetlands Park Visitors Center and Nature Preserve/Duck Creek trail system. Views are directed towards the line in the Las Vegas Wash and Sunrise Mountains. The existing H-frame structures blend with the backdrop views of the city and distant mountains towards Las Vegas from the Sunrise Trailhead. However, the new structures would be more massive and taller in the viewshed, and would be a more dominant feature. The replacement structures would be viewed against the sky to the southwest from the trailhead. Views from the visitor’s center and scenic drive on the south side of the wash are directed towards the mountains and riparian area. The line is currently back-dropped against the foothills to the northeast, as the replacement 230kV line would be. The monopole structures would be more visible than the smaller H-frame structures because of their size, but would not be set against the skyline from here. Views of the rebuilt line are perpendicular to the trails. West of the short section where the line parallels the trail on the south side of Wetlands Park, the line crosses the network of trails located adjacent to the wash in

Wetlands Park. Contrasts would be weak to moderate through this area depending on existing pole configuration.

Lake Mead Parkway, a recreation destination route and an area that is currently developed with commercial and nearby residential subdivisions would be crossed by the Project. Contrasts would be moderate to weak in this area, and viewers do not have particularly scenic views here.

Viewers traveling along the Tuscany Loop Road, a moderately sensitive corridor, also would view the line in the immediate foreground, and contrasts would be weak. Impacts are expected to be low for these viewers due to the similarity of the replacement poles and viewing context.

The 230kV transmission line primarily crosses Class C landscapes. Scenic quality is higher in the Las Vegas Wash and Tuscany/Weston Hills residential area where scenic quality/visual integrity is Class B. However, scenic quality impacts are expected to be low because of weak structure contrasts in a portion of these higher quality landscapes. Structure contrasts in Wetlands Park would be moderate between where the line enters the park boundary on the west and near where the line crosses Telephone Line Road (South Hollywood Boulevard extension/SNWA water pipeline road).

The Sunrise-Clark 230kV transmission line would cause approximately 2.5 miles of high visual impacts, 2.3 miles of moderate impacts, and 0.5 mile of low impacts.

Residences located in the developments associated with the Stallion Mountain Country Club would be impacted by the Sunrise-Clark 230kV transmission line. Residences currently have views of the Las Vegas Valley to the west that are partially obstructed by the existing 69kV transmission line and a parallel, existing transmission line that traverses the golf course. Views would be affected by contrasts created by the introduction of modified structures in the landscape. The existing single wood poles are about 60 feet tall, which is substantially shorter than the proposed structures. The presence of more massive and taller steel monopoles would make the transmission line corridor more noticeable to the casual viewer and increase the dominance of the line in the landscape (Figure 4.3-2).

Flamingo Arroyo Trail follows the Las Vegas Wash and is paralleled by the line from South Sloan Lane east to the Sunrise Substation, where it is crossed by both 230kV lines. The trail is located directly adjacent to an existing transmission line with steel monopoles. Although the Project would be in the immediate foreground view, trail users in this area have low expectations for visual change in the landscape and impacts would be moderate to low due to the dominance of the existing structures and the existing Sunrise Substation.

Views of the line from the Russell Road Recreation Complex would be in the foreground. Due to the location of several parallel transmission lines adjacent to the Project and the close proximity of the Clark Substation, contrast would be weak. Complex users have low expectations for visual change in the landscape and views are not scenic.

Views of the line from Horseman's and Dog Fancier's Park would be in the immediate foreground. One parallel transmission line would be adjacent to the Project. Contrast would be moderate. Park users have low expectations for visual change in the landscape and views are not scenic.

Viewers traveling Vegas Valley Drive, a moderately sensitive corridor, would view both lines in the foreground and immediate foreground. Contrasts would be moderate to weak in this area, and views are not scenic.

The Project would cross Jimmy Durante Boulevard and Tropicana Avenue, both moderately sensitive corridors. Impacts are expected to be low for viewers due to the similarity of the replacement poles to the existing steel monopoles in this area.

The 230kV transmission line primarily crosses Class C landscapes. Scenic quality is higher in the residential area north of Tropicana Avenue and south of Horseman's and Dog Fancier's Park, where scenic quality/visual integrity is Class B. However, initial scenic quality impacts are expected to be low because of weak structure contrasts in this higher quality landscape.

500kV Transmission Line

Alternative 1

Alternative 1 would tap the Harry Allen-Mead line approximately 2.7-miles north of the Lake Mead Parkway/Lake Las Vegas intersection. This route would cause approximately 6.6 miles of high visual impacts, 0.6 miles of moderate impacts, and 0.2 miles of low impacts. Visual impacts caused by this alternative would differ from the others in that BLM recreationists would be impacted to a greater degree than from the other alternatives. Additional landform contrasts not typically associated with the other alternatives would be created by the substantial road construction necessary for Alternative 1.

The primary impacts on residences would be caused by segments of the line common to all alternatives. Residences located on the north end of the Project just west of South Hollywood Boulevard and south of Desert Inn Road would have the project in immediate foreground view, with the new monopole structures dominating the view towards the Sunrise and Frenchman's Mountain area. This alternative would be further from the Lake Las Vegas Resort residential area than other alternatives, and would not be visible from there.

From KOP #4, the project would be viewed from the Weston Hills Community in the middleground viewing condition across the Las Vegas Wash at its closest point. Contrasts would be strong, and the towers would be viewed against the Sunrise/Frenchman's Mountains foothills except for the more distant structures on the northwest side of the project near the Sunrise Trailhead (Figure 4.3-3). Sunrise Mountain and Frenchman's Mountain dominate the views from this distance, and initial impacts would be moderate.

Alternative 1 would cross the most BLM public lands and high scenic quality (Class A) landscapes. It would also cause greater impacts to dispersed BLM recreationists and those accessing the Rainbow Gardens Geologic Area and Sunrise Management Area via Rainbow Gardens Road and Lava Butte Road. Clark County Wetlands Park recreationists would view the line from the Sunrise Trailhead, Visitors Center, and associated trails on the west side of the Project. Wetlands Park recreationists would not view a significant portion of the line on the east side of the alternative, but this would be substantially offset by the increased impacts to BLM recreationists.

Impacts would also occur to residences located on the northwest end of the Project (Figure 4.3-1). The monopole structures would dominate the landscape in this area, and would affect views towards the mountains. Contrasts would be strong, and high initial impacts cannot be reduced to a lower level. The proposed affordable housing development would have views of the Project down the road ROW, potentially blocking views towards Las Vegas. Scenic views from here would be directed towards Frenchman's Mountain and Sunrise Management Area. This alternative would

dominate the viewshed towards the Sunrise Management Area from the trailhead (Figures 4.3-3 and 4.3-4).

Two moderate sensitivity corridors would be impacted by the Project: South Hollywood Boulevard and Vegas Valley Drive. The line would parallel South Hollywood Boulevard for approximately 4,000 feet on the east side of the road.

This alternative is located primarily in Class B landscapes of the Las Vegas Wash and Rainbow Gardens area. This alternative crosses the most Class A landscapes compared to the other alternatives.

Class III VRM lands are assigned to all BLM public lands crossed by this alternative. Because no existing transmission lines are located outside of the existing BLM designated utility corridor on BLM public lands, strong to moderate contrasts would be created. Casual viewers heading north into the geologic area from Rainbow Gardens Road would be looking generally to the north and east away from the line, and the project would not dominate views from the BLM road. Those traveling from Rainbow Gardens south down the mountain; however, would have more prominent views of the line as viewers look towards the Las Vegas Wash and the city. From the Clark County trail (Pabco Road) and the trail network of Wetlands Park, the project would be a prominent landscape feature to the casual observer. The southern portion of the alternative paralleling Lava Butte Road at the Reclamation boundary would also be a prominent feature in the landscape, but would not dominate views, and therefore would be in conformance with Class III objectives.

Alternative 2

Alternative 2 would tap the Harry Allen-Mead line approximately 1.75 miles north of the Lake Mead Parkway/Lake Las Vegas intersection. This alignment would cause approximately 6.1 miles of high visual impacts and 0.9 miles of moderate impacts. Alternative 2 has impacts similar to those of Alternative 1 along the segment common to each at the north end of the Project just west of South Hollywood Boulevard and south of Desert Inn Road, where high residual impacts on residential viewers are expected to occur.

Tuscany, Calico Ridge, and Weston Hills residences would view strong contrasts created in the middleground across the Las Vegas Wash. The lattice structures would be viewed against the Rainbow Gardens/Sunrise Management Area foothills, and would appear to blend into the foothills. Strong contrasts at this distance would cause moderate impacts to residential viewers.

As with Alternative 1, two moderate sensitivity corridors would be affected by the Project: South Hollywood Boulevard and Vegas Valley Drive. The lattice structures would be located along South Hollywood Boulevard for approximately 4,000 feet on the east side of the road. The line would transition from lattice structures to monopole structures west of South Hollywood Boulevard.

This alternative would be within the foreground view of Wetlands Park Scenic Drive. The presence of the line would cause strong contrasts outside of the existing BLM designated utility corridor (Figure 4.3-5). This alternative is set back the farthest from travel corridors and the farthest from the Sunrise Trailhead. However, as with the other alternatives, the route crosses the Rainbow Gardens Road.

The additional setback of the line from sensitive viewpoints as compared to Alternatives 1 and 4 would help to blend the towers and conductors into the hillside landscape. However, additional access road scarring would be visible on the sloping foothills that would increase landform contrasts as compared to the other alternatives.

This alternative crosses Class A landscapes in the Rainbow Gardens area on the east side of the alternative. The diversity of colors and landforms in the area contribute to scenic quality, and the strong structure contrasts created would cause moderate scenic quality impacts.

As with Alternative 1, a portion of this alternative would cross Class III VRM objective lands. However, only a small portion of this alternative crosses (Class III) BLM public lands (about 3,800 feet). This 3,800-foot section is located on the east side of the alternative (common to Alternatives 2, 3 and 4), and is opposite of KOP #5 (Figure 4.3-5) across the Las Vegas Wash. Sensitive viewers near this section of the alternative include Wetlands Park users and Lake Las Vegas residences. The line would be a prominent landscape feature to Wetlands Park users, but would be viewed through the existing utility corridor for Lake Las Vegas residences. Some sky-lining would occur as the line crosses the existing ridge opposite KOP #5. Casual viewers would have their attention split between the hillside in the backdrop and the Las Vegas Wash immediately adjacent. The line would be nearly 0.5 mile from KOP #5 at its closest point, and thus would be visible in the foreground, but the project would not dominate views. Therefore, this alternative would be in conformance with Class III VRM objectives.

Alternative 3

Alternative 3 would also tap the Harry Allen-Mead line approximately 1.75 miles north of Lake Mead Parkway/Lake Las Vegas intersection. This alignment would cause approximately 6.0 miles of high visual impacts and 1.0 mile of moderate impacts. This alternative does not differ substantially from Alternative 2 in relation to impacts on residences. The project would be dominant in the viewshed from Sunrise Trailhead (Figure 4.3-3 and Alternative 1 discussion above). Travel corridor impacts are similar to Alternative 2, but the line would be farther from Wetlands Park Scenic Drive on the west side of the alternative (Figure 4.3-5). Scenic quality impacts would be nearly identical to Alternative 2, with the highest quality Class B landscapes being crossed in the Sunrise foothills and Las Vegas Wash areas.

This alternative would conform to Class III VRM objectives (see Alternative 2 discussion above).

Alternative 4

Alternative 4 would also tap the Harry Allen-Mead line approximately 1.75 miles north of the Lake Mead Parkway/Lake Las Vegas intersection. This alignment would cause approximately 6.0 miles of high visual impacts and 0.9 miles of moderate impacts. Alternative 4 would cause the highest total length of impacts on residential and recreational viewers. The project would also be dominant in the viewshed of Sunrise Trailhead (Figure 4.3-3 and Alternative 1 discussion above). This alternative would be closest to KOP #5, Tuscany development, Weston Hills and Calico Ridge residential areas. It would also cause the highest impacts to Wetlands Park Scenic Drive viewers. Scenic quality impacts would be similar to Alternatives 1, 2 and 3 (Figure 4.3-6).

This alternative would conform to Class III VRM objectives (see Alternative 2 discussion above).

Mitigation Measures

Mitigation measures are proposed in Chapter 2, Table 2.4-4 to avoid and minimize impacts on visual resources from the Project.

No Action Alternative

Under the No Action Alternative, the Project would not be built. There would be no land disturbing activities or rebuilding and installation of new transmission lines as a result of the Project. However, the existing transmission lines (LV #1 and LV #3) would still be in place and maintenance would continue.

4.4 BIOLOGICAL RESOURCES

4.4.1 Introduction

This section contains a discussion of potential impacts that would result from the construction, operation, and maintenance of the Proposed Action and No Action Alternative related to vegetation, wildlife, and special status species.

Impacts to biological resources would be low from the construction, operation, and maintenance of the Sunrise-Equestrian 230kV transmission line and all four action alternatives for the 500kV transmission line. The greatest impact to vegetation would arise from direction trampling and ground clearing associated with transmission line construction. Mitigation measures to offset impacts to vegetation are proposed in Chapter 2, Table 2.4-4. Direct loss of a small amount of habitat from construction activities, noise, and human presence are likely causes of impacts to wildlife species. Mitigation measures to reduce impacts to wildlife species are proposed in Chapter 2, Table 2.4-4. Impacts to special status species (plants and wildlife) would be low from the construction, operation, and maintenance of the Sunrise-Equestrian 230kV transmission line and all four action alternatives for the 500kV transmission line, except Alternative 2. A large number of Las Vegas bearpoppy plants are located along the proposed corridor for Alternative 2, resulting in a moderate impact to this species. Impacts for special status species are similar to general vegetation and wildlife. Mitigation measures for special status plants and wildlife include surveys, onsite monitoring, and transplanting.

All four of the alternative 500kV transmission line routes traverse the Rainbow Gardens ACEC (Figure 3.4-1). Rainbow Gardens ACEC is denoted as a “Less Intensively Managed Area” (LIMA) by the Clark County MSHCP. BLM regards this area as a Restoration Level 2 (R2), High Priority Recovery Area. An R2 area is managed toward actions that reduce human impacts to the landscape for the purposes of recovery of federally listed or special status species (e.g., desert tortoise, Las Vegas bearpoppy), preservation of scenic values, or protection of cultural property. Examples include visual resources Classes 1 and 2, desert tortoise critical habitat, and ACEC. Any ground disturbance within the Rainbow Gardens ACEC would be restored according to the restoration plan for Rainbow Gardens ACEC.

There would be no impacts to biological resources (plants, wildlife, or special status species) from substation modifications and the 230kV Sunrise-Clark (LV #1) transmission line. The urban setting, existing land development, and the development of structures within the footprint of existing facilities (i.e., substations) negates impacts to biological resources from these actions.

4.4.2 Methods

The methodology used during field surveys and baseline data summarized in this section are presented in Chapter 3, Section 3.4 of this EA. In addition, the regulatory framework established for management and protection of special status species is also presented in Chapter 3, Section 3.4 of this EA.

The analysis conducted for biological resources uses the following criteria for vegetation, wildlife, and special status species. Impacts would be considered significant if construction, operation, or maintenance of a project alternative would:

- Adversely affect a federally listed or state protected species of plant, wildlife, or fish;
- Significantly change the existing abundance, diversity, or habitat value of plants, wildlife, or fish, or the distribution of existing plant communities; or
- Substantially disturb native resident or migratory wildlife species or breeding residents.

Vegetation

- *Low impact:* No measurable disturbance or disturbance that is localized within a relatively small area with no effect upon overall viability of the plant community.
- *Moderate impact:* Localized disturbance of a plant community (i.e., abundance, distribution, quantity, or quality).
- *High impact:* Substantially measurable and permanent disturbance of a plant community.

Wildlife

- *Low impact:* No habitat loss or loss of a small amount of habitat that is not critical for species survival; temporary disturbance that does not interfere with sensitive behaviors such as migration, breeding, nesting, or other activities necessary for survival.
- *Moderate impact:* Loss of a moderate amount of non-critical habitat; temporary disturbance of foraging, breeding, or nesting behaviors; mortality of a few individual species of non-special status species.
- *High impact:* Loss of a large amount of general habitat or small amount of habitat critical for species survival; mortality levels of common species that do not jeopardize a population, mortality of a few individuals of special status species.

Special Status Species

- *No effect:* The Project would not affect a listed species or designated critical habitat.
- *May affect, Not likely to adversely affect:* The Project would result in insignificant or beneficial effects upon listed species or designated critical habitat.
- *May affect, Likely to adversely affect:* The Project would result in direct or indirect adverse effects upon listed species or designated critical habitat.

4.4.3 Vegetation Impacts and Mitigation Measures

230kV Transmission Line – Sunrise-Equestrian (LV #3)

General Vegetation

Construction and maintenance of the 230kV transmission line (Sunrise-Equestrian) would result in several impacts including destruction or damage to individual plants, disturbance of the seed bank, grading and compacting soils, and permanent loss of vegetative communities and habitats

and creating dust that may interfere with photosynthesis. Ground-clearing activities could also facilitate the introduction and spread of non-native, invasive plant species. Water would be utilized as the primary dust suppressant. Along the southern portion of the Sunrise-Equestrian 230kV new build, a synthetic polymer emulsion palliative would be applied experimentally. This type of palliative has been successfully applied in Mojave Desert habitats at Fort Irwin, CA. Synthetic polymer emulsion palliatives are benign, with very low toxicity. Application of this type of palliative at Fort Irwin has resulted in no negative impacts to plant or animal species. The experimental design monitoring would have to be agreed upon by the USFWS, Reclamation, and NPC. If no experimental design can be agreed upon by all parties, then water would be used as a dust suppressant. The USFWS would review the available information on each proposed palliative and approve the use of each on an experimental basis. If no palliative is approved, NPC would use water to control dust. The experimental use of dust palliatives is not anticipated to adversely impact plant species.

Maintenance activities would affect vegetation during periodic access to the project area for routine inspection, repairs, and emergency repairs. However, these activities would occur infrequently and predominantly in areas of existing disturbance (existing access roads). Therefore, impacts to vegetative resources associated with maintenance activities would be minimal.

The Sunrise-Equestrian 230kV transmission line crosses urban, creosote-bursage, Mojave mixed-scrub, and tamarisk riparian habitats (Chapter 3, Table 3.4-1). Generally speaking, pre-existing disturbance increases with increased proximity to the Las Vegas Valley. Construction of the transmission line would result in the permanent disturbance of 10.5 acres and temporary disturbance of 82 acres (Table 4.1-1). This disturbance would primarily occur within the urban areas and creosote-bursage communities. Creosote-bursage is a common vegetative community in the region. The 230kV transmission line crosses approximately 0.9 miles of tamarisk riparian community along the Las Vegas Wash. Construction of this line would disturb a small amount of tamarisk riparian vegetation. Given that the majority of the Sunrise-Equestrian 230kV transmission line would replace an existing 69kV line and construction activities would utilize existing access roads where available, low impacts to general vegetative communities would result from construction. Mitigation measures to minimize potential adverse impacts to vegetation associated with the Sunrise-Equestrian 230kV transmission line, including maximizing use of existing access roads and re-seeding disturbed areas (Chapter 2, Table 2.4-4).

Special Status Species

The only special status plant species observed within the Sunrise-Equestrian 230kV transmission line corridor was the state endangered Las Vegas bearpoppy. No federally listed plant species occur within the 230kV transmission line corridors. Three individual Las Vegas bearpoppy plants were documented within the Sunrise-Equestrian 230kV corridor north of the Las Vegas Wash (Chapter 3, Figure 3.4-1). Impacts to Las Vegas bearpoppy populations are similar to those described above for general vegetation. Mitigation measures to minimize potential adverse impacts to Las Vegas bearpoppy associated with the 230kV transmission line include: preconstruction surveys, avoidance of plants, construction monitoring, and re-seeding disturbed areas. A complete list of mitigation measures is presented in Chapter 2, Table 2.4-4.

500kV Transmission Lines

General Vegetation

Construction of the 500kV transmission line would result in impacts similar to those described above for the 230kV transmission line. All of the alternative 500kV transmission line routes cross urban, creosote-bursage, and Mojave mixed-scrub habitat (Chapter 3, Table 3.4-1). Differences in the amount of habitats crossed and impacts associated with each alternative are described below.

Alternative 1

Alternative 1 would result in approximately 93 acres of temporary disturbance and 19 acres of permanent disturbance (Table 4.4-1). This amount of permanent disturbance is the second lowest among the 500kV alternatives. The majority of permanent disturbance under Alternative 1 is associated with line structures. Alternative 1 traverses twice as much Mojave mixed-scrub habitat compared to the other alternatives (Alternatives 2, 3, and 4, see Table 3.4-1) and trampling of mixed shrubs, forbs, and associated understory species would also double from the other alternatives. Reclamation efforts would focus on soil stabilization and reseeding with native grass and forbs. Recovery to preconstruction Mojave mixed-scrub community conditions would be established over a longer period of time due to successional processes (i.e., shrub encroachment) required. Impacts to vegetation would be low under Alternative 1.

Alternative 2

Alternative 2 would result in approximately 94 acres of temporary disturbance and 26 acres of permanent disturbance (Table 4.4-1). This amount of permanent disturbance is the highest among the 500kV alternatives. The majority of permanent disturbance under Alternative 2 is associated with access roads. Alternative 2 traverses approximately the same amount of creosote-bursage habitat than the other alternatives (Alternatives 2, 3, and 4, see Table 3.4-1). Therefore the associated impacts to creosote-bursage communities would be similar to those described above for Alternative 1. Approximately half as much Mojave mixed-scrub habitat is traversed under Alternative 2. Therefore, impacts to Mojave mixed-scrub communities would be less than from Alternative 1. The occurrence of shrub and understory trampling would be slightly less due to a shorter length of transmission line occurring in this habitat. Reclamation efforts would focus on soil stabilization and reseeding with native grass and forbs. Recovery to preconstruction Mojave mixed-scrub community condition would be established slightly faster due to less ground disturbance occurring in this plant community. Impacts to vegetation would be low under Alternative 2.

Alternative 3

Alternative 3 would result in approximately 83 acres of temporary disturbance and 21 acres of permanent disturbance (Table 4.4-1). This amount of permanent disturbance is the second highest among the 500kV alternatives. The majority of permanent disturbance under Alternative 3 is associated with access roads. Impacts to creosote-bursage habitat would be similar to Alternatives 1 and 2, however slightly less due to slightly less creosote-bursage habitat associated with Alternative 3. Impacts to Mojave mixed-scrub communities would be similar to those described for Alternative 1. Impacts to vegetation would be low under Alternative 3.

Alternative 4

Alternative 4 would result in approximately 101 acres of temporary disturbance and 18 acres of permanent disturbance (Table 4.4-1). Alternative 4 would have the least amount of permanent disturbance and therefore the least long-term affect on vegetation. The majority of permanent disturbance under Alternative 4 is associated with transmission line structures. Impacts to creosote-bursage communities would be similar to those described for Alternatives 1 and 2. Impacts to Mojave mixed-scrub communities would be similar to those described for Alternatives 2 and 3. Impacts to vegetation would be low under Alternative 4.

Ground disturbance associated with the construction of the 500kV transmission line could result in the introduction or spread of noxious weed species. Plant seeds may be transported to the project area by construction vehicles and equipment that have been operated in areas where noxious weeds are present. In areas where ground disturbance is substantial, aggressive non-native weed species may become established. Due to the small amount of disturbance that would occur at each structure site, the risk of exotic species invasion is expected to be low. An increase in exotic species invasion could occur at select access road construction locations. A Weed Control Plan would be developed as part of the Plan of Development. This plan would include mitigation measures to minimize and reduce the potential for establishment and spread of noxious weeds such as utilizing certified weed free fill, vehicle wash requirements, and post construction monitoring. Mitigation measures proposed for vegetation are provided in Chapter 2, Table 2.4-4.

Special Status Plant Species

The only special status plant species observed within the 500kV transmission line corridors was the state endangered Las Vegas bearpoppy. No federally listed plant species occur within the 500kV transmission line corridor. Impacts to Las Vegas bearpoppy populations are similar to those described above for general vegetation. Impact differences among the alternative 500kV transmission lines are described below. Mitigation measures to minimize potential adverse impacts to Las Vegas bearpoppy associated with the 500kV transmission lines include preconstruction surveys, avoidance of plants, relocating impacted bearpoppies where avoidance is not feasible, and reseeding disturbed areas. Mitigation measures pertaining to Las Vegas bearpoppy are provided in Chapter 2, Table 2.4-4.

Alternative 1

Field surveys documented 312 individual bearpoppy plants within the Alternative 1 transmission line corridor. The majority of the occurrences were documented along the center of the route near Rainbow Garden and Kodachrome Roads (Chapter 3, Figure 3.4-1). The proposed transmission line crosses an abundant amount of suitable habitat in this general location. Impacts to Las Vegas bearpoppy would be low under Alternative 1.

Alternative 2

Field surveys documented 2,026 individual bearpoppy plants within the Alternative 2 transmission line corridor. The majority of the occurrences were documented along the center of the route near Rainbow Garden and Kodachrome Roads (Chapter 3, Figure 3.4-1). The proposed transmission line crosses an abundant amount of suitable habitat in this general location. Impacts to Las Vegas bearpoppy would be moderate under Alternative 2.

Alternative 3

Field surveys documented 308 individual bearpoppy plants within the Alternative 3 transmission line corridor. The majority of the occurrences were documented along the center of the route near Rainbow Garden and Kodachrome Roads (Chapter 3, Figure 3.4-1). The proposed transmission line crosses an abundant amount of suitable habitat in this general location. Impacts to Las Vegas bearpoppy would be low under Alternative 3.

Alternative 4

Field surveys documented 302 individual bear poppy plants within the Alternative 4 transmission line corridor. The majority of the occurrences were documented along the center of the route near Rainbow Garden and Kodachrome Roads (Chapter 3, Figure 3.4-1). The proposed transmission line crosses an abundant amount of suitable habitat in this general location. Impacts to Las Vegas bearpoppy would be low under Alternative 4.

Mitigation Measures

Mitigation measures are proposed for the Project to avoid or minimize potential impacts to vegetation (Chapter 2, Table 2.4-4). Individually, these mitigation measures address specific resources, but taken together they are a substantive approach to minimizing effects to vegetation.

In addition, NPC would prepare a POD identifying methods to be used during and after construction to minimize impacts to vegetation. The POD would be submitted to BLM for approval before construction could commence. A transmission line POD typically includes the following requirements:

- Plants would be salvaged from work sites for replanting after construction.
- Topsoil and rocks would be separated and stabilized during construction in temporary disturbance areas.
- Work areas would be re-contoured with soil and rocks replaced.
- Plants may be transplanted back onto the disturbance areas.
- The area may be reseeded.
- In critical habitat, additional requirements such as seed collection, shrub propagation and/or live shrub plantings may also be required.
- All areas would be monitored to ensure success criteria are achieved.

Because of the acreage of gypsum soils crossed by the Project, impacts to some gypsum-endemic plants such as Las Vegas bearpoppy, sticky ringstem and Las Vegas buckwheat would be likely, despite management practices and mitigation measures to minimize impacts. As required, appropriate incidental take permits would be obtained from the Nevada Division of Forestry (NDF) for Critically Endangered flora (NRS 527.260-.300).

No Action Alternative

The No Action Alternative would cause no immediate impacts to vegetation. It would reduce the cumulative impacts to natural plant communities and special status plant species over the near term of projects proposed for the region.

4.4.4 Wildlife Impacts and Mitigation Measures

230kV Transmission Line - Sunrise-Equestrian (LV #3)

General Wildlife

Construction, operation, and maintenance of the 230kV transmission line would not likely adversely affect wildlife species. Effects include permanent or temporary displacement of individual animals, loss of habitat, behavioral modification, and mortality. These effects would be associated with short-term increases in noise and human activity during construction activities, clearing of vegetation and ground disturbance for work areas, access roads, and the long-term presence of transmission lines and transmission pole structures. Indirectly, dust created from construction activity can impact wildlife through inhalation of dust particles or ingestion of dust particles that settle on plant material. Dust would be controlled primarily through the application of water. Along the southern portion of the Sunrise-Equestrian 230kV new build, a synthetic polymer emulsion palliative would be applied experimentally for dust control. This type of palliative has been successfully applied in Mojave Desert habitats at Fort Irwin, CA. Synthetic polymer emulsion palliatives are benign, with very low toxicity. Application of this type of palliative at Fort Irwin has resulted in no negative impacts to plant or animal species. The experimental design would be worked out and agreed upon by the USFWS, Reclamation, and NPC. If no experimental design can be agreed upon by all parties, then water would be used for dust suppression. The USFWS would review the available information on each proposed palliative and approve the use of each on an experimental basis. If no palliative is approved, NPC would use water to control dust. The experimental use of dust palliatives is not anticipated to adversely impact wildlife species.

Increased human activity and noise during construction of the 230kV transmission line would cause localized, short-term disturbances that could result in the temporary displacement of individual animals. Activity and noise levels would return to existing conditions upon completion of construction. Given the existence of large areas of similar habitats adjacent to the project areas, temporary displacement would represent a low impact to common wildlife species.

Clearing of vegetation and ground disturbance at work areas, pole sites, and access roads would result in some habitat loss. Graded areas would be re-seeded following construction, which would reduce the duration of temporary habitat loss. Given the limited amount of permanent disturbance, the avoidance of habitats for sensitive species, and the presence of large areas of similar habitat adjacent to the corridors, temporary and permanent habitat loss would represent a low impact to common wildlife species.

The Project could result in some mortality of individual animals. Species that have limited mobility or that occupy burrows within construction areas could be crushed during clearing and grading activities. This threat of mortality would be temporary (duration of construction), and low given the ability of most species to avoid vehicles and equipment. Incorporating speed limit restrictions for construction traffic would further reduce this threat.

The presence of the transmission line structures and conductors would provide hunting and perching points for several species of birds. These structures would provide elevated vantage points that raptors, ravens, and other avian species may exploit for hunting perches. Small mammals and certain reptile species would be more susceptible to predation from the creation of these new perch sites in natural habitat. In areas where there is an existing line and/or the line will be rebuilt, wildlife species would be more likely adapted to the presence of the associated

structure. The areas of the proposed 230kV line are not known to be high raptor or raven concentration areas. Increased perch and hunting sites created from the transmission line structures would have a low impact to wildlife species.

The presence of transmission lines and poles represent a potential long-term mortality threat to birds and bats as a result of collisions with conductors and electrocution. While birds and bats may occasionally collide with transmission lines and/or poles, these species are generally able to detect the presence of and avoid lines and poles. Research has indicated that the risk of collision is largely related to the location of the line relative to bird concentration areas (APLIC 2005 and USFWS, 2005). Avoiding construction of new lines in areas of high bird use is the best way to prevent or minimize collisions. Given the absence of any features that concentrate bird use along the 230kV corridor, collisions are not expected to be a significant source of avian mortality and would result in a low impact.

Raptor electrocution on transmission lines has received significant attention, and has resulted in the development of “raptor-safe” or “avian-safe” design guidelines for new transmission lines (APLIC 1996; APLIC 2005, and USFWS 2005). Research has indicated that most avian electrocutions occur on low-medium voltage lines (4kV to 69kV) lines on which the conductor spacing is small resulting in electrical bridging by large birds (APLIC 2005 and USFWS, 2005). The standard raptor-safe design includes a minimum vertical separation of 60 inches between conductors. The proposed 230kV transmission line would include vertical separation defined by NESC between conductors, and would be avian-safe with no potential for electrocution of raptors or other bird species. In addition to avian safe construction, full time biological monitors would be present during construction to ensure mitigation protocols are employed. The Project would result in low impact with regards to avian electrocution.

Most of the birds nesting along the proposed 230kV transmission line route are protected under the Migratory Bird Treaty Act (MBTA). The MBTA of 1918 and subsequent amendments (16 U.S.C. 703-711) state that it is unlawful to take, kill, or possess migratory birds. Few bird species found in the United States are not protected by the MBTA. Migratory birds potentially nesting along the 230kV transmission line route at the most risk for impact are shrub nesting species such as the black throated sparrow (*Amphispiza bilineata*) and species utilizing riparian areas such as summer tanagers (*Piranga rubra*). Approximately 3.7 miles of shrubland and 0.9 miles of riparian habitat would be traversed by the proposed 230kV transmission line. Implementation of mitigation measures WMM-5, -6, and -7 in Table 2.4-4 aims to minimize impacts to migratory birds. Additional nesting habitat is present adjacent to the proposed transmission line along the Las Vegas Wash and throughout the Rainbow Gardens ACEC. Preconstruction surveys and timing restrictions would minimize impacts to migratory birds (WMM-3, -5, -6, -7). Therefore, the Project is anticipated to result in low impacts to migratory birds.

Special Status Species

A summary of potential effects from the 230kV and 500kV transmission lines on special status species is provided in Table 4.4-1.

Table 4.4-1 Summary of Potential Impacts to Special Status Wildlife Species

Common Name	Scientific Name	Effects Determination
Federally Listed Species		
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	No effect
Western yellow-billed cuckoo	<i>Coccyzus americanus occidentalis</i>	No effect
Yuma clapper rail	<i>Rallus longirostris yumanensis</i>	No effect
Desert tortoise	<i>Gopherus agassizii</i>	May affect, likely to adversely affect
Sensitive Species¹		
Banded Gila monster	<i>Heloderma suspectum cinctum</i>	Low impact
Chuckwalla	<i>Sauromalus obesus</i>	Low impact
Golden eagle	<i>Aquila chrysaetos</i>	Low impact
Western burrowing owl	<i>Athene cunicularia hypugea</i>	Low impact
Snowy plover	<i>Charadrius alexandrinus</i>	Low impact
Black tern	<i>Chlidonias niger</i>	Low impact
Prairie falcon	<i>Falco mexicanus</i>	Low impact
Peregrine falcon	<i>Falco peregrinus anatum</i>	Low impact
Sandhill crane	<i>Grus canadensis</i>	Low impact
Blue grosbeak	<i>Guiraca caerulea</i>	Low impact
Western least bittern	<i>Ixobrychus elixis hesperis</i>	Low impact
Loggerhead shrike	<i>Lanius ludovicianus</i>	Low impact
Phainopepla	<i>Phainopepla nitens</i>	Low impact
Summer tanager	<i>Piranga rubra</i>	Low impact
White-faced ibis	<i>Plegadis chihi</i>	Low impact
Vermilion flycatcher	<i>Pyrocephalus rubinus</i>	Low impact
Crissal thrasher	<i>Toxostoma crissale</i>	Low impact
Lucy's warbler	<i>Vermivora luciae</i>	Low impact
Arizona Bell's vireo	<i>Vireo bellii arizonae</i>	Low impact
Pallid bat	<i>Antrozous pallidus</i>	Low impact
Pale Townsend's big-eared bat	<i>Corynorhinus townsendii pallescens</i>	Low impact
Big brown bat	<i>Eptesicus fuscus</i>	Low impact
Spotted bat	<i>Euderma maculatum</i>	Low impact
Greater western mastiff bat	<i>Eumops perotis californicus</i>	Low impact
Allen's big-eared bat	<i>Idionycteris phyllotis</i>	Low impact
Silver-haired bat	<i>Lasionycteris noctivagans</i>	Low impact
Western red bat	<i>Lasiurus blossevillei</i>	Low impact
Hoary bat	<i>Lasiurus cinereus</i>	Low impact
California leaf-nosed bat	<i>Macrotus californicus</i>	Low impact
California myotis	<i>Myotis californicus</i>	Low impact
Small-footed myotis	<i>Myotis ciliolabrum</i>	Low impact
Fringed myotis	<i>Myotis thysanodes</i>	Low impact
Cave myotis	<i>Myotis velifer</i>	Low impact
Long-legged myotis	<i>Myotis volans</i>	Low impact
Yuma myotis	<i>Myotis yumanensis</i>	Low impact
Big free-tailed bat	<i>Nyctinomops macrotis</i>	Low impact
Western pipistrelle bat	<i>Pipistrellus hesperus</i>	Low impact
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	Low impact
Desert bighorn sheep	<i>Ovis canadensis nelsoni</i>	Low impact

Common Name	Scientific Name	Effects Determination
¹ Sensitive species are those listed as federal species of concern, BLM sensitive, Nevada state protected, and Clark County MSHCP		

Federal Species

Southwestern willow flycatcher

The Sunrise-Equestrian 230kV transmission line crosses potential habitat for the southwestern willow flycatcher. The 230kV transmission line does not cross designated critical habitat. Southwestern willow flycatchers are migratory residents that do not breed or nest in the project area (SWCA 2007). Construction-related impacts include noise, traffic, or other human activities that would potentially disturb individual southwestern willow flycatchers that are foraging or passing through the vicinity of the project area. These impacts would be localized and temporary. Minor clearing of individual tamarisk trees (potential habitat) would occur as a result of construction. Migratory occurrence of the flycatcher would not be impacted from the tree clearing. The Sunrise-Equestrian 230kV transmission line component of the project would result in no effect to the southwestern willow flycatchers or designated critical habitat.

Western yellow-billed cuckoo

The Sunrise-Equestrian 230kV transmission line crosses potential habitat for the western yellow-billed cuckoo. Western yellow-billed cuckoos are migrants that do not breed or nest in the project area (SWCA 2006). Construction-related impacts may include noise, traffic, or other human activities would potentially disturb individual yellow-billed cuckoos that are foraging or passing through the vicinity of the project area. These impacts would be localized and temporary. Minor clearing of individual tamarisk trees (potential habitat) would occur as a result of construction. Migratory occurrence of the cuckoo would not be impacted from the tree clearing due to adjacent habitat present. Preconstruction surveys, timing limitations (no construction activity would occur near occupied western yellow-billed cuckoo habitat from June through mid-August), and avoidance mitigations would further reduce potential impacts to western yellow-billed cuckoos occurring in the area. The Sunrise-Equestrian 230kV transmission line component of the project would result in no effect to the western yellow-billed cuckoo.

Yuma clapper rail

The Sunrise-Equestrian 230kV transmission line crosses potential habitat for the Yuma clapper rail. The Yuma clapper rail is a migratory resident that does not breed or nest in the project area (SWCA 2007). Construction-related impacts include noise, traffic, or other human activities that would potentially disturb any individual Yuma clapper rails that are foraging or passing through the vicinity of the project area. These impacts would be localized and temporary. Minor clearing of individual tamarisk trees (potential habitat) would occur as a result of construction. Migratory occurrence of the clapper rails would not be impacted from the tree clearing. No marsh habitat would be modified as a result of the transmission line construction. The Sunrise-Equestrian 230kV transmission line component of the project would result in no effect to the Yuma clapper rail.

Desert tortoise

The Sunrise-Equestrian 230kV transmission line disturbs approximately 74 acres of occupied desert tortoise habitat. The southern portion of the 230kV line supports the highest quality tortoise habitat, and most tortoises were observed in these areas (Figure 3.4-1).

Potential impacts to the desert tortoise resulting from project construction and maintenance activities would include removal of habitat, loss of habitat features such as cover and forage, and

injury or loss of animals. Desert tortoises may be harassed by removal or displacement from the construction area. Construction activities may result in injury or loss of desert tortoises that enter the access roads or construction areas.

Impacts to desert tortoise would be reduced through the experimental use of a synthetic polymer emulsion dust palliative. The experimental application would be located along the southern portion of the 230kV transmission line. The palliative would be applied topically by qualified personnel according to manufacture instructions and would adhere to the Interim Policy on Dust Palliative Use in Clark County, Nevada. This type of palliative has been used at other locations in the Mojave Desert (i.e. Fort Irwin, CA). This type of palliative is benign in nature with very low toxicity to aquatic organisms. The synthetic polymer emulsion dust palliative has been applied in occupied desert tortoise habitat at Fort Irwin with no known impacts to tortoise or habitat. The use of a palliative may reduce potential tortoise vehicle collisions that could occur with the use of water as a dust suppressant. Water is also a limited resource in the Mojave Desert and the use of a palliative would reduce water use.

Construction of the facilities would potentially result in degradation of desert tortoise habitat due to soil and vegetation disturbance, introduction of non-native plant species, habitat fragmentation, and increased noise, traffic, equipment movement, and human presence. Following project construction and site restoration, desert tortoises would likely reoccupy restored portions of the Project area.

The project would comply with all regulations regarding protection of the desert tortoise. Implementation of the terms and conditions as outlined in the project-specific biological opinion and the following recommended mitigation measures is expected to avoid and minimize adverse impacts to this species.

- Preconstruction construction surveys for presence along the proposed route,
- Restricting surface disturbance to the minimum amount needed for construction,
- Educating construction personnel about listed species,
- Full time construction monitoring by qualified biologists,
- Placement of tortoise fencing in areas of known tortoise habitat,
- Restoring habitat in areas temporarily disturbed during project construction, and
- Payment of mitigation fees for habitat compensation.
- Relocation of tortoises on non-Bureau of Reclamation Lands

As a result of the implementation of these mitigation measures and the nature and magnitude of construction, the Sunrise-Equestrian 230kV transmission line component of the project may affect, and is likely to adversely affect the desert tortoise.

BLM, State of Nevada, and Clark County Sensitive Species

Chuckwalla and Gila monster

The Sunrise-Equestrian 230kV transmission line crosses through chuckwalla and Gila monster habitat. Potential impacts to the chuckwalla and Gila monster include loss of habitat and temporary disturbance and mortality during construction. Pre-construction surveys and construction monitoring, following NDOW protocol, would help to minimize the potential for mortality or injury to these species. Following construction and site restoration, the chuckwalla and Gila monster would likely re-occupy restored portions of the project area. The Project may affect individuals but would not substantially reduce chuckwalla or Gila monster populations or habitat. The Sunrise-Equestrian 230kV transmission line would result in a low impact to the chuckwalla and Gila monster.

Western burrowing owl

The Sunrise-Equestrian 230kV transmission line crosses through occupied burrowing owl habitat. Potential project-related impacts to burrowing owls include temporary disturbance, injury or loss of individuals, and loss of habitat and destruction of burrows during construction. Pre-construction surveys and construction monitoring would help identify known owl locations to minimize the potential for burrowing owl mortality and harassment (MBTA 1918). Potential nest locations would be surveyed and collapsed prior to construction from mid-August to early March. Construction disturbance would be minimized around occupied nest sites by ensuring that a minimum of 6.5 acres of foraging habitat, calculated on a 100-m (approximately 300 feet) foraging radius around the natal burrow, would be maintained per pair to ensure enough foraging habitat for fledging success. Following disturbance associated with construction activities, the burrowing owl would likely re-occupy the project area. The Sunrise-Equestrian 230kV transmission line would result in a low impact to the burrowing owl.

Golden eagle, peregrine falcon, and prairie falcon

The golden eagle, peregrine falcon, and prairie falcon are all known to forage within and in the vicinity of the Sunrise-Equestrian 230kV transmission line corridor. While these species may forage in proximity to the proposed transmission line, there are no concentrations of prey that would attract them into any particular area. Golden eagles, peregrine and prairie falcon nesting is not known along the proposed route. Suitable nesting habitat for golden eagles, peregrine and prairie falcons is absent along the proposed 230kV transmission line. Potential effects upon these species include construction-related disturbance and mortality due to collisions and electrocutions.

Activities related to construction of the transmission line, including grading access roads, pole setting, and conductor stringing, could disturb eagles, falcons, and other raptors that are foraging in the vicinity. Given the availability of large areas of adjacent foraging habitat, disturbance and temporary displacement of these species would represent a low impact for the 230kV transmission line.

Transmission line strikes are generally not considered to be an important cause of mortality for these species because they are highly maneuverable and do not fly together in large flocks (APLIC 1994, 1996, 2005). Because of these flight characteristics, raptors are seldom involved in collisions with transmission lines or structures. Raptor electrocutions on high voltage lines (greater than 69kV) are extremely rare and do not represent a major mortality factor (APLIC 1996, 2005). This is due to the conductor spacing on higher voltage lines, which exceeds the wingspan of raptors and precludes birds from making contact with two conductors simultaneously. The design of the 230kV transmission line would incorporate raptor-safe configurations, which would minimize the potential electrocution hazard for raptors. The 230kV transmission line would result in a low impact to the golden eagle, peregrine falcon, and prairie falcon.

Riparian and Shore Birds (snowy plover, black tern, sandhill crane, blue grosbeak, Western least bittern, Phainopepla, summer tanager, white-faced ibis, vermilion flycatcher, Crissal thrasher, Lucy's warbler, Arizona Bell's vireo)

The Sunrise-Equestrian 230kV transmission line crosses the Las Vegas Wash which supports suitable habitat for a number of riparian and shore bird species that are known to occasionally occur in the project area. Most of these species are transients that are present during migrations but do not breed or nest in the project area. Construction-related noise, traffic, or other human activities would potentially disturb individuals that are foraging in the vicinity of the project area. These impacts would be localized and temporary. Construction of the Sunrise-Equestrian 230kV

transmission line may require minor clearing of individual tamarisk trees. The Sunrise-Equestrian 230kV transmission line would result in a low impact to these riparian and shore bird species.

Upland Birds (loggerhead shrike)

The Sunrise-Equestrian 230kV transmission line corridor crosses through loggerhead shrike habitat. Thorny shrub and tree species, a key foraging component of shrike habitat, would not be significantly disturbed. Additional impacts to the loggerhead shrike include temporary disturbance from noise, traffic, human activities, and loss of habitat. The project would result in a low impact to this species.

Bats (pallid bat, Townsend's big-eared bat, spotted bat, big brown bat, greater western mastiff bat, Allen's big-eared bat, silver-haired bat, western red bat, hoary bat, California leaf-nosed bat, California myotis, small-footed myotis, fringed myotis, cave myotis, long-legged myotis, Yuma myotis, big free-tailed bat, western pipistrelle, Brazilian free-tailed bat)

These bat species likely forage along the Sunrise-Equestrian 230kV transmission line corridor. Potential effects upon these bats include loss of foraging habitat and mortality of individuals. Given the limited amount of permanent habitat loss, and the existence of large areas of similar habitat adjacent to the project area, the loss of potential bat foraging habitat would represent a small impact upon bat species. Additionally, bat flying agility, coupled with their use of sonar to navigate through the environment, reduces the likelihood for potential collisions with transmission lines or poles. It is anticipated that the potential for mortality represents no identifiable impact upon these bat species. The Sunrise-Equestrian 230kV transmission line corridor would represent a low impact to sensitive bat species.

Desert bighorn sheep

There is no suitable habitat for desert bighorn sheep along the Sunrise-Equestrian 230kV transmission line. Field survey efforts did not document any sign of bighorn sheep along the 230kV corridor. There would be no impact to desert bighorn sheep from the 230kV transmission line.

500kV Transmission Line

General Wildlife

Construction and maintenance of the 500kV transmission line would result in impact types to wildlife species similar to those described above for the 230kV transmission line. Each of the alternative 500kV transmission line routes crosses urban, creosote-bursage, and Mojave mixed-scrub habitats (Chapter 3, Table 3.4-1). None of the alternative 500kV transmission line routes traverse riparian habitat (i.e., Las Vegas Wash). Differences in the amount of habitat and wildlife species likely impacted by each alternative are described below.

Alternative 1

Alternative 1 would result in approximately 93 acres of temporary disturbance and 19 acres of permanent disturbance (Table 4.1-1). This amount of permanent disturbance is the second lowest among the 500kV alternatives. The majority of permanent disturbance under Alternative 1 is associated with line structures. Alternative 1 traverses twice as much Mojave mixed-scrub habitat compared to the other alternatives (Alternatives 2, 3, and 4, see Chapter 3, Table 3.4-1) and disturbance and habitat loss to species utilizing mixed shrubs, forbs, and associated understory in this habitat would be greater. Disturbance impacts would be temporary as wildlife species would likely reoccupy the transmission line corridor post-reclamation. Reclamation efforts would provide understory habitat of native grass and forbs initially. Recovery to preconstruction Mojave

mixed-scrub habitat condition would be established over a longer period of time due to successional processes (i.e., shrub encroachment) required. Impacts to wildlife would be low under Alternative 1.

Alternative 2

Alternative 2 would result in approximately 94 acres of temporary disturbance and 26 acres of permanent disturbance (Table 4.1-1). This amount of disturbance is the highest among the 500kV alternatives. The majority of permanent disturbance under Alternative 2 is associated with access roads. Alternative 2 traverses approximately the same amount of creosote-bursage habitat as the other alternatives (Alternatives 1, 3, and 4). Therefore the associated impacts to wildlife species utilizing creosote-bursage habitat would be similar to those described above for Alternative 1. Approximately half as much Mojave mixed-scrub habitat is traversed under Alternative 2. Therefore, impacts to wildlife species utilizing Mojave mixed-scrub habitat would be less than Alternative 1. Disturbance to wildlife species in Mojave mixed-scrub would be slightly less due to less transmission line occurring in this habitat. Reclamation efforts would provide understory habitat of native grass and forbs initially. Recovery to preconstruction Mojave mixed-scrub habitat condition would be established over a longer period of time due to successional processes (i.e., shrub encroachment) required. Impacts to wildlife would be low under Alternative 2.

Alternative 3

Alternative 3 would result in approximately 83 acres of temporary disturbance and 21 acres of permanent disturbance (Table 4.1-1). This amount of disturbance is the second highest among the 500kV alternatives. The majority of permanent disturbance under alternative 3 is associated with access roads. Impacts to wildlife utilizing creosote-bursage habitat would be similar to Alternatives 1 and 2, however slightly less due to slightly less creosote-bursage habitat occurring along the Alternative 3 route. Impacts to wildlife species utilizing Mojave mixed-scrub habitat would be similar to those described for Alternative 1. Impacts to wildlife would be low under Alternative 3.

Alternative 4

Alternative 4 would result in approximately 101 acres of temporary disturbance and 18 acres of permanent disturbance (Table 4.1-1). Alternative 4 would have the least amount of permanent disturbance, therefore the least long-term affect on wildlife species. The majority of permanent disturbance under Alternative 4 is associated with line structures. Impacts to wildlife species utilizing creosote-bursage habitat would be similar to those describe for Alternatives 1 and 2. Impacts to wildlife species utilizing Mojave mixed-scrub habitat would be similar to those described for Alternatives 2 and 3. Impacts to wildlife species would be low under Alternative 4.

Ground disturbance associated with construction of the 500kV transmission line could result in the introduction or spread of noxious weed species. The spread of noxious weeds has the potential to indirectly impact wildlife species through the degradation of habitats. Due to the small amount of disturbance that would occur at each structure site, the risk of exotic species invasion is expected to be low. A Weed Control Plan would be developed as part of the POD. This plan would include mitigation measures to minimize and reduce the potential for establishment and spread of noxious weeds such as utilizing certified weed free fill, vehicle wash requirements, and post construction monitoring. Impacts to wildlife species from noxious weeds are anticipated to be low for all the 500kV alternatives.

Special Status Species

A summary of potential effects from the 230kV and 500kV transmission lines on special status species discussed below is provided in Table 4.4-1.

Federal Species

Southwestern willow flycatcher

None of the alternative 500kV transmission line corridors cross potential habitat or designated critical habitat for the flycatcher. Construction-related impacts may include noise, traffic, or other human activities that would potentially disturb individual Southwestern willow flycatchers that are foraging or passing through the vicinity of the project area. These impacts would be localized and temporary. The 500kV transmission line alternatives would result in no adverse affect to the southwestern willow flycatchers or designated critical habitat.

Western yellow-billed cuckoo

None of the alternative 500kV transmission line corridors cross potential habitat for the yellow-billed cuckoo. Construction-related impacts may include increased noise, traffic, or other human activities that would potentially disturb individual western yellow-billed cuckoos that are foraging or passing through the vicinity of the project area. These impacts would be localized and temporary. Furthermore preconstruction surveys, timing limitations, and avoidance mitigation would further reduce impacts to western yellow-billed cuckoos occurring in the area. The 500kV transmission line alternatives would result in no effect to the western yellow-billed cuckoo.

Yuma clapper rail

None of the alternative 500kV transmission line corridors cross potential habitat for the clapper rail. Construction-related impacts include: noise, traffic, or other human activities would potentially disturb any individual Yuma clapper rails that are foraging or passing through the vicinity of the project area. These impacts would be localized and temporary. No marsh habitat would be modified as a result of the transmission line construction. The project would result in no adverse affect to the Yuma clapper rail.

Desert tortoise

All four alternative 500kV transmission line corridors disturb approximately 120 acres of occupied desert tortoise habitat. The eastern portions of the 500kV corridors support the highest quality tortoise habitat, and most tortoises were observed in these areas (Figure 3.4-1).

Potential impacts to the desert tortoise are similar to those described for the 230kV line and include removal of habitat, loss of habitat features such as cover and forage, and injury or loss of animals.

Construction of the facilities would result in degradation of desert tortoise habitat due to soil and vegetation disturbance, introduction of non-native plant species, habitat fragmentation, and increased noise, traffic, equipment movement, and human presence. Following project construction and site restoration, desert tortoises would likely reoccupy restored portions of the Project area.

All 500kV alternatives would result in an adverse affect to the desert tortoise.

BLM, State of Nevada, and Clark County Sensitive Species

Chuckwalla and Gila monster

All four alternative 500kV transmission line corridors cross chuckwalla and Gila monster habitat. Potential impacts to the chuckwalla and Gila monster are similar to those described for the 230kV

line and include loss of habitat and temporary disturbance and mortality during construction. Pre-construction surveys and construction monitoring, following NDOW protocol, would help to minimize the potential for mortality or injury to these species. Following construction and site restoration, the chuckwalla and Gila monster would likely re-occupy restored portions of the project area. The Project may affect individuals but would not substantially reduce chuckwalla or Gila monster populations or habitat. The 500kV alternatives would result in a low impact to the chuckwalla and Gila monster.

Western burrowing owl

All four alternative 500kV transmission line corridors cross through occupied burrowing owl habitat. Potential project-related impacts to burrowing owls are similar to those described for the 230kV line and include temporary disturbance, injury or loss of individuals, and loss of habitat and destruction of burrows during construction. Pre-construction surveys and construction monitoring would help identify known owl locations to minimize the potential for burrowing owl mortality and harassment (MBTA 1918). Potential nest locations would be surveyed and collapsed prior to construction from mid-August to early March. Construction disturbance would be minimized around occupied nest sites by ensuring that a minimum of 6.5 acres of foraging habitat, calculated on a 100-m (approximately 300 feet) foraging radius around the natal burrow, would be maintained per pair to ensure enough foraging habitat for fledging success. Following disturbance associated with construction activities, the burrowing owl would likely re-occupy the project area. All 500kV alternatives would result in a low impact to the burrowing owl.

Golden eagle, peregrine falcon, and prairie falcon

The golden eagle, peregrine falcon, prairie falcon, and other raptors are all known to forage within all four 500kV transmission line alternative corridors. While these species may forage in proximity to the proposed transmission lines, there are no concentrations of prey that would attract them into any particular area. Suitable nesting habitat for peregrine falcon occurs on the cliffs in the vicinity of Alternative 1. Potential effects upon these species are similar to those described for the 230 kV line and include construction-related disturbance and mortality due to collisions and electrocutions.

The design of the 500kV transmission lines would incorporate raptor-safe configurations, which would minimize the potential electrocution hazard for raptors. All 500kV alternatives would result in a low impact to the golden eagle, peregrine falcon, and prairie falcon.

Riparian and shore Birds (snowy plover, black tern, sandhill crane, blue grosbeak, Western least bittern, Phainopepla, summer tanager, white-faced ibis, vermilion flycatcher, Crissal thrasher, Lucy's warbler, Arizona Bell's vireo)

None of the alternative 500kV transmission line corridors cross potential habitat for these species. All 500kV alternatives would result in no impacts to these riparian and shore bird species.

Upland Birds (loggerhead shrike)

All four alternative 500kV transmission line corridors cross through loggerhead shrike habitat. Potential impact types to the loggerhead shrike are similar to those describe for the 230kV line and include temporary disturbance and loss of habitat. All 500kV alternatives would result in a low impact to this species.

Bats (pallid bat, Townsend's big-eared bat, spotted bat, big brown bat, greater western mastiff bat, Allen's big-eared bat, silver-haired bat, western red bat, hoary bat, California leaf-nosed bat, California myotis, small-footed myotis, fringed myotis, cave myotis, long-legged myotis, Yuma myotis, big free-tailed bat, western pipistrelle, Brazilian free-tailed bat)

These bat species likely forage along all four alternative 500kV transmission line corridors. Potential effects upon these bats are similar to those described for the 230kV line and include loss of foraging habitat and mortality of individuals. Given the limited amount of permanent habitat loss, and the existence of large areas of similar habitat adjacent to the project area, the loss of potential bat foraging habitat would represent a small impact upon bat species. Given the flying ability of bat species and their use of sonar to navigate through the environment, the potential for collisions with transmission lines or poles is extremely small. It is anticipated that the potential for mortality represents no identifiable impact upon bat species. There is no difference among the 500kV alternatives relative to potential impacts to bats.

Desert bighorn sheep

Impacts to desert bighorn sheep may include construction-related noise, traffic, or other human activities that would potentially disturb any individual sheep that are foraging in the vicinity of the alternative 500kV routes. Impacts to desert bighorn sheep along the alternative 500kV routes could occur with loss of habitat and disturbance during construction. Desert bighorn sheep along the eastern portion of the routes, near the Harry Allen-Mead Tap, may be disturbed by construction noise that would cause them to avoid the transmission line corridor. Following completion of construction, bighorn sheep would likely utilize the corridor. Long-term impacts could also result from disturbance during periodic maintenance activities; however, these activities would occur infrequently.

Some increased public access would likely result from road construction or improvements in areas previously undisturbed. This could increase hunting pressure and harassment of wildlife, but with construction occurring mainly within existing utility corridors, access is not expected to increase considerably.

The presence of the transmission lines could make it more difficult for the Nevada Department of Wildlife (NDOW) to conduct aerial surveys to monitor the bighorn sheep population. However, implementation of mitigation measure WMM-2 (Chapter 2, Table 2.4-4) would minimize this impact.

There is suitable habitat for desert bighorn sheep in the vicinity of the Rainbow Gardens ACEC along Alternative 1; however, no direct bighorn use was documented along the Alternative 1 corridor during field surveys (SWCA 2007). Impacts to desert bighorn sheep would be low for Alternative 1.

Suitable habitat for the desert bighorn sheep occurs along the eastern end of the 500kV transmission line corridors of Alternatives 2, 3, and 4. Habitat is also present on adjacent lands located in the Rainbow Gardens ACEC. Field surveys documented bighorn sheep sign along the Alternative 2, 3, and 4 corridors (SWCA 2007). Alternatives 2, 3, and 4 would result in a low impact to desert bighorn sheep.

Mitigation Measures

Mitigation measures are proposed for the Project to avoid or minimize potential impacts to wildlife (Chapter 2, Table 2.4-4). In addition, mitigation measure VMM-4 for vegetation, to close unnecessary roads, would be beneficial to wildlife as well as vegetation resources.

No Action Alternative

The No Action Alternative would cause no immediate impacts to wildlife. It would reduce the cumulative impacts to wildlife and special status wildlife species over the near term of projects proposed for the region.

4.5 CULTURAL RESOURCES

4.5.1 Introduction

Reclamation and the cooperating agencies are in the final stages of negotiating a Programmatic Agreement (PA) to address inventory methods, consultation procedures, and impacts of the project on historic properties located within the Area of Potential Effect (APE) for the preferred alternative. Reclamation is the lead federal agency for this undertaking and the BLM – Las Vegas Field Office and the Nevada State Historic Preservation Office are cooperating agencies as defined by the PA.

As directed in 36 CFR 800.3(a), Reclamation has determined that the Project is an undertaking with the potential to cause effects on historic properties. As a result, as directed in 36 CFR 800.4, Reclamation would consult with the Nevada State Historic Preservation Office to determine the APE, determine the scope of identification efforts, evaluate the significance of identified properties, determine whether properties are eligible for the NRHP, and assess effects of the undertaking on historic properties. Reclamation will also consult with the Nevada State Historic Preservation Office to identify other consulting parties, as directed in 36 CFR 800.3(f). Furthermore, as directed in 36 CFR 800.5 and 36 CFR 800.6, Reclamation will assess adverse effects of the project on historic properties and resolve those adverse effects through avoidance or mitigation. Mitigation of the effects of the project will be addressed through consultation, per the PA. The PA among Reclamation, BLM, NPC, and the Nevada State Historic Preservation Officer sets forth the procedure in the event of any dispute or termination of consultation.

Execution of the terms and conditions of the PA would satisfy compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and its implementing regulations at 36CFR 800.

4.5.2 Methods

The methods used to identify historic properties along the 230kV and 500kV alignments were detailed in Chapter 3. For the analysis of impacts to historic properties from the 500kV alignments, comparison of the number and types of historic properties determined eligible for the NRHP and the estimated impact area for each alternative are used. For this analysis, only sites eligible for listing on the NRHP are considered; eligibility is defined in 36CFR60. A cultural resource site may be recommended eligible for the NRHP if it:

- (A) is associated with events that have made a significant contribution to the broad patterns of our history; or
- (B) is associated with the lives of persons significant in our past; or
- (C) embodies the distinctive characteristics of a type, period, or method of construction; or represents the work of a master; or possesses high artistic values; or represents a significant and distinguishable entity whose components may lack individual distinction; or
- (D) has yielded, or may be likely to yield, information important in prehistory or history (36CFR60).

Sites considered potentially eligible under at least one of the four aforementioned criteria must also be evaluated for integrity of location, design, setting, materials, workmanship, feeling, and association. To be eligible for listing on the NRHP, a site must possess integrity of those elements directly related to the criterion or criteria under which it would be determined potentially eligible.

For the purposes of the EA, there are enough known historic properties to get a sense of the potential effects of the Project on historic properties. Known historic properties include the Las Vegas Wash Archaeological District, which includes historic properties eligible for the NRHP under Criteria A and C. Direct and indirect impacts to the District from the Project would have to be considered. Assessment of effects on the District would be directed by the PA. A comparison of differences in the cultural resource affected environment along each alignment and the potential effects on historic properties can be completed through an analysis of the existing data. Reclamation and BLM have accepted this analysis of existing data as sufficient for evaluation of the impacts of each alternative on historic properties. A 100% pedestrian survey would be conducted for the preferred alternative. Historic property identification, evaluation, and finding of effects, as well as consultation efforts, would be directed by the PA.

Historic properties may be affected directly by construction or indirectly by increasing the accessibility of historic properties to the general public or by visual impacts from the new transmission line. For this analysis, a cultural resource is considered to be impacted by an alternative if its site boundary overlaps with the proposed ROW. Because of the potential for indirect impacts resulting from increased access to the area, sites that overlap even partially with the proposed alignment are considered impacted by the proposed alignment. Indirect impacts may also result from changes to the visual environments; any such impacts would be addressed under the terms of the PA. Because the precise location of power poles, and thus the intensity of construction activities at specific locations, is not yet known, degrees of impact are not considered here; historic properties would simply be impacted or not.

4.5.3 Impacts and Mitigation Measures

Construction of the Project has several components that could impact historic properties. These Project components include construction of a new double-circuit 500kV transmission line between the Harry Allen-Mead 500kV transmission line and the Sunrise Substation, upgrading the existing LV #3 69kV line to a 230kV line, constructing a new 230kV/lower voltage transmission line from the existing LV #3 to the Equestrian Substation, and upgrading the existing LV #1 69kV line to a 230kV line.

Historic properties may be affected directly by construction or indirectly by increasing the accessibility of historic properties to the general public. The primary direct impacts to historic properties are to the ground surface and subsurface from construction of the transmission lines, which would include disturbance from construction of the power poles and footings, access road construction, and improvement of some existing roads. Impacts to historic properties may continue after construction if better access roads increase foot and vehicle traffic to the area, which can lead to an increase in vandalism and/or looting of cultural resource sites. The PA defines consultations on determinations of eligibility, findings of effects, and mitigation measures.

In addition to the discussions of impacts to specific sites below, all Project alternatives cross the Las Vegas Wash Archaeological District. The District is considered eligible for the NRHP under Criteria C and D and includes historic properties eligible at the regional landscape level (Perry 2001). The District currently includes a variety of prehistoric and historic sites, all located along

the Las Vegas Wash; most of the sites with research potential are located within the Clark County Wetlands Park along the Las Vegas Wash, with a few sites north of the boundary on land owned by Reclamation (Perry 2001). An assessment of impacts to the District by the Project would be directed by the PA, as would any necessary mitigation efforts. Additionally, any newly identified sites within the boundaries of the District would be assessed to determine whether they are contributing or non-contributing elements of the District. Assessments of the effects of the Project on any such historic properties would be directed by the PA. Visual impacts to properties within the District that are eligible for the NRHP under Criterion C, and for which the visual setting is a critical component of their eligibility, would also be considered and directed by the PA.

230kV Transmission Lines – Sunrise-Clark (LV #1) and Sunrise-Equestrian (LV #3)

All action alternatives include a proposed upgrade of the Sunrise-Clark (LV #1) line from a 69kV to a 230kV line. This upgrade includes removal of the existing transmission line sections. LV #1 has not yet been evaluated as a historic property for possible listing on the NRHP. A pedestrian survey of this transmission line should be done to see if any historical segments that retain integrity and significance remain; identification and evaluation efforts would be directed by the PA, as would any mitigation efforts, if needed.

All action alternatives include a proposed upgrade of the Sunrise-Equestrian (LV #3) line from a 69kV to a 230kV line. This upgrade includes removal of the historical (i.e., greater than 50 years old) LV #3 (Site 26CK6150) transmission line. This historical power line extends for the majority of the length of the proposed Sunrise-Equestrian line, although some new construction would extend from the southern end of the existing LV #3 line to the southeast to the Equestrian substation. The historical LV #3 transmission line has been determined eligible for the NRHP at the regional level and impacts to the LV #3 line would therefore require mitigation. The PA that is in the final stages of negotiation includes mitigation methods for impacts to the historical LV #3 line.

The new construction portion of the Sunrise-Equestrian (LV #3) line may also impact as-yet-unidentified historic properties along this part of the alignment. Intensive pedestrian inventory of the entire Sunrise-Equestrian line will be conducted. The PA addresses specific procedures for identifying, evaluating, assessing adverse effects to, and mitigating adverse effects to historic properties determined eligible for the NRHP and those yet to be discovered within the APE of the preferred alternative.

500kV Transmission Line

The Project has four alternatives, each of which is analyzed separately for historic properties determined eligible for the NRHP (Chapter 3, Table 3.5-1). The range of variation in the acres disturbed (both temporary and permanent) by each alternative is small, from 103.45 to 119.09 acres. For non-renewable resources such as historic properties, adverse effects could be caused by either temporary or permanent ground disturbance; any adverse effects would require mitigation according to stipulations set forth in the PA.

Alternative 1

In addition to impacts to eligible historic Site 26CK6150, Alternative 1 would impact two properties, neither of which has been evaluated for listing on the NRHP: 26CK6493 and 26CK6497. Site 26CK6493 is a prehistoric site with rock clusters and an artifact scatter. Site 26CK6497 is a prehistoric site with rock clusters and a lithic scatter.

Alternative 1 would impact one historic property determined eligible for the NRHP and two properties that have not yet been evaluated for listing on the NRHP. This alternative would disturb less ground surface than Alternatives 2 and 4.

Alternative 2

In addition to impacts to eligible historic Site 26CK6150, Alternative 2 would impact one historic property determined eligible for the NRHP (Site 26CK1285, a prehistoric complex with rock rings and artifacts), and one site that remains unevaluated for listing on the NRHP (Site 26CK6488, a prehistoric trail with a rock ring and a lithic scatter).

Alternative 2 is similar to Alternative 3 in that it would impact two historic properties determined eligible for the NRHP, with one unevaluated property also located along the alignment. Alternative 2 would disturb the greatest area of ground surface making it similar to Alternative 4 in its probability of impacting additional as-yet-unidentified sites.

Alternative 3

In addition to impacts to eligible historic Site 26CK6150, Alternative 3 would impact one historic property determined eligible for the NRHP, 26CK1285, a prehistoric complex with rock rings and artifacts.

Alternative 3 is similar to Alternative 2 in that it would impact two historic properties determined eligible for the NRHP. Compared to the other alternatives, Alternative 3 would disturb the least amount of ground surface making it least likely to impact additional as-yet-unidentified sites.

Alternative 4

In addition to impacts to eligible historic Site 26CK6150, Alternative 4 would impact two additional historic properties determined eligible for the NRHP, sites 26CK1285 and 26CK1300. Both sites are prehistoric complexes with rock rings and artifacts. Alternative 4 would also impact two unevaluated sites: 26CK6493 and 26CK6497. Site 26CK6493 is a rock cluster and artifact scatter, Site 26CK6497 is a rock cluster and lithic scatter.

Alternative 4 would impact the greatest number of historic properties (3 properties) determined eligible for the NRHP, as well as two unevaluated properties. Additionally, this alternative would have the second greatest amount of ground disturbance making it more likely to impact additional as-yet-unidentified sites than Alternatives 1 and 3.

Mitigation Measures

Mitigation measures proposed for the Project to avoid and minimize impacts to historic properties area summarized in Chapter 2, Table 2.4-4.

No Action Alternative

The No Action Alternative would not actively affect any cultural resource sites, all sites would simply remain subject to natural processes and other non-project related impacts. Additionally, the No Action Alternative would avoid bringing additional people into the vicinity of historic properties and thus has the lowest likelihood of increasing damage to sites by vandalism or looting.

4.6 PALEONTOLOGICAL RESOURCES

4.6.1 Introduction

Impacts on paleontological resources primarily concern the potential destruction of non-renewable paleontological resources and the loss of information associated with these resources. Project-related ground disturbances such as the building or improvement of access roads, construction of new transmission line structures, grading, and vegetation removal would have the potential to adversely impact paleontological resources in those Project areas determined to be paleontologically sensitive. Without mitigation, the fossils contained in sensitive geologic units, as well as the paleontological data they could provide if properly salvaged and documented, could be adversely impacted (destroyed), rendering them permanently unavailable for future scientific research.

Adverse impacts on significant paleontological resources associated with surface disturbance within the Project APE can be reduced to below the level of significance with the implementation of paleontological mitigation measures described in this section.

4.6.2 Methods

For this analysis, a paleontological file search was conducted by SWCA (SWCA 2008) and mitigation recommendations were developed based on the results of the study and in accordance with guidelines set forth in the BLM paleontological resources manual (Handbook H-8270-1 [1998]). The study was accomplished by first identifying the geologic units within the Project APE using published geologic maps, and then researching the known potential of the geologic units (rock formations) within the Project APE to contain scientifically significant fossils both within and nearby the study area. Each geologic unit determined to occur within the project APE was ranked according to the PFYC, summarized in Chapter 3. No field survey was conducted for this study.

The distribution of geologic units within the Project APE is depicted in Figure 3.6-1 and listed in Table 3.6-1 (Chapter 3). The paleontological sensitivity of the Project APE is shown on Figure 4.6-1.

4.6.3 Impacts and Mitigation Measures

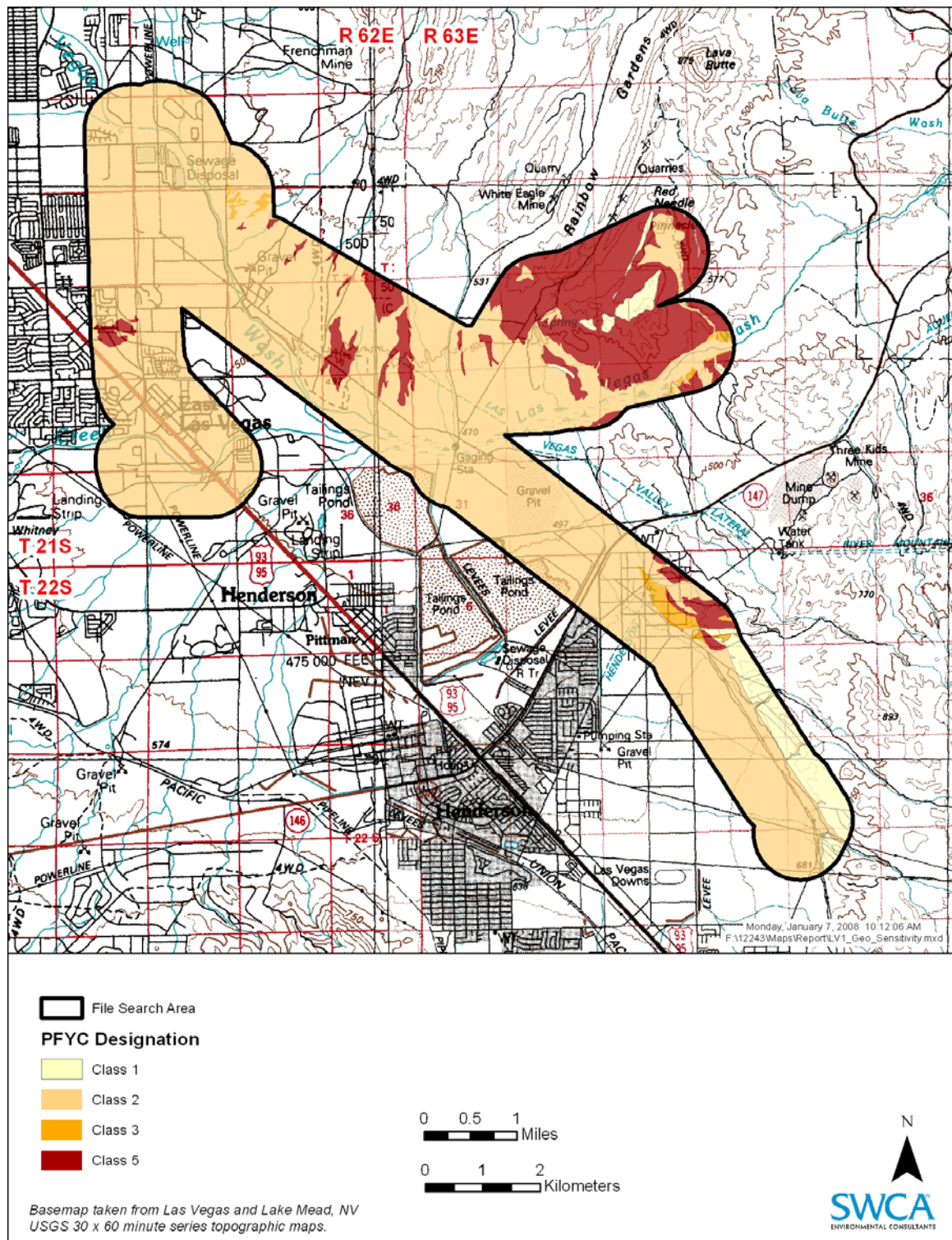
Direct adverse impacts on surface or sub-surface paleontological resources are the result of destruction via breakage and crushing in construction-related excavations. Ground disturbance has the potential to adversely impact an unknown quantity of fossils which may occur on or underneath the surface in areas containing paleontologically sensitive geologic units. Without mitigation, these fossils, as well as the paleontological data they could provide if properly salvaged and documented, could be adversely impacted (destroyed), rendering them permanently unavailable. Direct adverse impacts can typically be mitigated to below a level of significance through implementation of paleontological mitigation. Mitigation also creates a beneficial impact because it results in the salvage of fossils that may never have been unearthed via natural processes. With mitigation, these newly exposed fossils become available for scientific research, education, display, and preservation into perpetuity at a public museum.

Indirect adverse impacts typically include those effects which result from the continuing implementation of management decisions and associated activities, or the normal ongoing operations of facilities constructed within a specific project area. They also occur as the result of the construction of new roads in areas that were previously inaccessible, which increases public

access and therefore increases the likelihood of the loss of paleontological resources through vandalism and unlawful collecting (poaching). Indirect impacts are difficult to mitigate to below the level of significance, but they can be greatly reduced by increasing public awareness about the scientific importance of paleontological resources through education, community partnerships, and interpretive displays, as well informing the public about penalties for unlawful destruction or illegal collection of these resources from public lands.

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. In general, for scientifically significant paleontological resources that are present within the study area, the potential cumulative impacts would be low, so long as mitigation was implemented to avoid or salvage the resources. The mitigation measures below would effectively recover the value to science and society of significant fossils that would otherwise have been destroyed by surface disturbing actions.

Figure 4.6-1 Paleontological Sensitivity Map for the Sunrise Tap Project Area



230kV Transmission Lines – Sunrise-Clark (LV #1) and Sunrise-Equestrian (LV #3)

The proposed upgrade of the Sunrise-Clark (LV #1) and Sunrise-Equestrian (LV #3) lines will require some new construction that may result in surface disturbance within paleontologically sensitive geologic units. The potential to impact paleontological resources during the upgrade and new construction of the 230kV transmission lines was analyzed using the PFYC classification system as described in Chapter 3. For this analysis, the APE includes a 200-foot wide study corridor (100 feet on either side of the transmission line centerlines) and is presented in terms of surficial acreage in the Table 4.6-1.

Table 4.6-1 Number of Acres per PFYC Class within the APE of the Sunrise-Clark (LV #1) and Sunrise-Equestrian (LV #3) 230kV Lines

230kV Lines	<i>Class 1</i>	<i>Class 2</i>	<i>Class 3</i>	<i>Class 4/5</i>	<i>Class 5</i>
Sunrise-Clark LV #1	N/A	125	N/A	N/A	2
Sunrise-Equestrian LV #3	N/A	257	5	N/A	8

The 230kV transmission lines have a total of 10 acres that are underlain by highly sensitive geologic units (Class 5) within the Project APE.

500kV Transmission Line

The proposed 500 kV transmission line has four alternatives, each of which is analyzed using the PFYC classification system as described in Chapter 3. For this analysis, the APE includes a 1,000-foot wide study corridor (500 feet on either side of the transmission line centerline) and is presented in terms of surficial acreage in the Table 4.6-2.

Table 4.6-2 Number of Acres per PFYC Class within the APE of the 500kV Transmission Line Alternatives

500kV Alternative	<i>Class 1</i>	<i>Class 2</i>	<i>Class 3</i>	<i>Class 4/5</i>	<i>Class 5</i>
Alternative 1	2	638	13	N/A	245
Alternative 2	7	657	13	N/A	189
Alternative 3	7	644	13	N/A	203
Alternative 4	1	677	13	N/A	192

Alternative 1 has the largest number of total acres that are underlain by highly sensitive geologic units (Class 5) within the Project APE. Alternative 3 has the second highest and Alternative 4 has the third highest. Alternative 2 has the lowest number of total acres underlain by paleontologically sensitive geologic units (Class 5).

Mitigation Measures

Proposed mitigation measures for paleontological resources are provided in Chapter 2, Table 2.4-4. A detailed description of these mitigation measures is provided in the paleontological file search report (SWCA 2008).

No Action Alternative

The No Action Alternative would not result in any construction of the Project action alternatives. Therefore, the No Action Alternative would not result in adverse impacts to paleontological resources, either in the short- or long-term. However, the beneficial impact of the potential for increased knowledge made available to scientists, educators and the general public by salvage of paleontological resources during construction of the Project alternatives would not occur under the No Action Alternative. Important beneficial impacts to paleontological resources do exist for the No Action Alternatives in the preservation, *in-situ*, of paleontological resources for future generations who might have the benefit of new technological advances in construction, fossil excavation and scientific analyses.

4.7 AIR QUALITY

4.7.1 Introduction

This section describes the potential air quality impacts that could result from the construction, operation, and maintenance of the Sunrise Tap Transmission Line Project.

Impacts to air quality from construction of the Project would occur from emissions from heavy equipment and vehicles, and fugitive dust; however, these impacts would be temporary and minimal with the implementation of mitigation measures (Chapter 2, Table 2.4-4). No criteria pollutant or fugitive dust emissions would result from operation and maintenance of the Project. The Project would not conflict with approved air quality management plans, expose sensitive receptors to substantial pollutant concentrations, or create objectionable odors.

4.7.2 Methods

Air quality impacts were determined using relevant federal, state, and local government air quality criteria. Air quality impacts as a result of the Project would be considered significant if impacts would:

- Conflict with or obstruct implementation of a current approved air quality management plan (i.e., SIPs);
- Violate any air quality regulation or standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which Clark County is in non-attainment under the NAAQs;
- Expose sensitive receptors to substantial pollutant concentrations; and
- Create objectionable odors affecting a substantial number of people.

4.7.3 Impacts and Mitigation Measures

Substations - Equestrian, Clark, Sunrise, Winterwood

The Project includes modifications to four existing substations: Sunrise, Winterwood, Clark and Equestrian. All modifications would occur within the existing substation sites, therefore no new

ground disturbing activities (i.e., clearing and grading) would be necessary for construction. Fugitive dust would be emitted during construction from equipment movement.

Modifications of the existing substations would require the use of heavy equipment and support vehicles such as a crane, haul trucks, and pickup trucks. Operation of the heavy equipment and vehicles would generate emissions from combustion including the criteria pollutants, CO, PM₁₀, and O₃ (from NO_x emissions), which are in non-attainment for Clark County. However, modification activities would be temporary and would not occur at the same time for all four substations. The temporary nature and staggering of substation modifications at different times would minimize impacts on air quality. The mitigation measures described in Table 2.4-4 would further reduce temporary air emissions generated from modification of the four substations.

Operation and maintenance of the substations would not impact air quality.

230kV Transmission Lines - Sunrise-Clark (LV #1) and Sunrise-Equestrian (LV #3)

The Project includes construction of two quad-circuit 230kV transmission lines. The Sunrise-Equestrian (LV #3) 230kV transmission line would connect the Sunrise Substation and the Equestrian Substation. Approximately 9 miles of existing 69kV transmission line would be replaced with 230kV line and 2.5 miles of new 230kV line would be constructed. The Sunrise-Clark (LV #1) 230kV transmission line would connect the Sunrise Substation and Clark Substation. Four miles of existing 69kV transmission line would be replaced with 230kV line and two new segments totaling 1.2 miles would be constructed.

Construction of the 230kV transmission lines would generate emissions from the operation of heavy equipment and support vehicles that were estimated in Table 2.4-3 for the Project. Emissions from construction equipment and vehicles would include the criteria pollutants, CO, PM₁₀, and O₃ (from NO_x emissions), which are in non-attainment for Clark County. Construction activities would be temporary and would be sequenced so that not all activities or phases would occur at the same time, which would minimize impacts on air quality. The mitigation measures listed in Table 2.4-4 would further reduce temporary air emissions from construction of the 230kV transmission lines.

As shown in Table 4.7-1, construction of the Sunrise-Equestrian and Sunrise-Clark 230kV transmission lines would disturb an estimated 92 and 47.5 acres of ground surface, respectively.

Table 4.7-1 Estimated Ground Disturbance (in acres) Comparison by 230kV Line

230kV Lines	Structures	Work Areas	Access Roads	Totals
Sunrise-Equestrian	5	82	5	92
Sunrise-Clark	2.5	45	0	47.5

Ground disturbance from clearing and grading for structures, work areas, and access roads may result in fugitive dust from soil disturbance and wind entrainment. Fugitive dust means any solid particulate matter that becomes airborne. The Clark County Air Quality Regulations requires a Dust Control Permit for soil disturbing or construction activities greater than 0.25 acres of overall area. NPC would obtain a Dust Control Permit from the DAQEM and would include a Dust Mitigation Plan with appropriate Control Measures from the Construction Activities Dust Control Handbook. A Dust Control Permit for a construction project of 50 acres or more in area shall also contain an actual soils analysis of the entire project using the appropriate ASTM test method to

determine soil types (Section 94.5.7 of the Air Quality Regulations). The mitigation measures proposed in Table 2.4-4 would be implemented as applicable to the Project to minimize fugitive dust.

A synthetic polymer emulsion palliative would be applied experimentally along the 2.5 mile new build portion of the Sunrise-Equestrian 230kV transmission line for dust control. Water would be utilized as the primary dust suppressant elsewhere. This type of palliative has been successfully applied in similar landscapes at Fort Irwin, CA. Synthetic polymer emulsion palliatives are benign, with very low toxicity to the environment.

Operation and maintenance of the 230kV transmission lines would not impact air quality.

500kV Transmission Line

A new double circuit 500kV transmission line would be constructed from the Harry Allen–Mead (HAM) 500kV transmission line to a new 500kV yard within the existing Sunrise Substation. There are four alternative routes for the 500kV transmission line. Potential impacts to air quality are discussed by alternative below.

Alternative 1

The Alternative 1 route alignment is approximately 7.4 miles long. Construction of the 500kV transmission line would generate emissions from the operation of heavy equipment and support vehicles that were estimated in Table 2.4-3 for the Project. Emissions from construction equipment and vehicles would include the criteria pollutants, CO, PM₁₀, and O₃ (from NO_x emissions), which are in non-attainment for Clark County. Construction activities would be temporary and would be sequenced so that not all activities or phases would occur at the same time, which would minimize impacts on air quality. The mitigation measures proposed in Table 2.4-4 would further reduce temporary air emissions from construction of the 500kV transmission line.

As shown in Table 4.7-2, construction of Alternative 1 would disturb an estimated 111 acres of ground surface.

Table 4.7-2 Estimated Ground Disturbance (in acres) Comparison by 500kV Alternative

Alternative Route	Structures	Work Areas	Access Roads	Totals
1	10	93	8	111
2	10	94	16	120
3	10	83	11	104
4	10	101	8	119

Ground disturbance from clearing and grading for structures, work areas, and access roads may result in fugitive dust from soil disturbance and wind entrainment. Fugitive dust means any solid particulate matter that becomes airborne. The Clark County Air Quality Regulations requires a Dust Control Permit for soil disturbing or construction activities greater than 0.25 acres of overall area. NPC would obtain a Dust Control Permit from the DAQEM and would include a Dust Mitigation Plan with appropriate Control Measures from the Construction Activities Dust Control Handbook. Since the Project would disturb more than 50 acres, a soils analysis of the Project site

would also be conducted as required under Section 94.5.7 of the Air Quality Regulations. The mitigation measures proposed in Table 2.4-4 would be implemented as applicable to the Project to minimize fugitive dust.

Operation and maintenance of the 500kV transmission line would not impact air quality.

Alternative 2

The Alternative 2 route alignment is approximately 7.0 miles long. Emissions from heavy equipment and support vehicles would be similar to Alternatives 1, 3 and 4 as described under Alternative 1. Ground disturbance required for this alternative is estimated at 120 acres, which is greater than all other alternatives by 1 to 16 acres. Impacts from fugitive dust would still be similar for all alternatives as described under Alternative 1.

Alternative 3

The Alternative 3 route alignment is approximately 7.0 miles long. Emissions from heavy equipment and support vehicles would be similar to Alternatives 1, 2, and 4 as described under Alternative 1. Ground disturbance required for this alternative is estimated at 104 acres, which is the least amount of disturbance compared to the other alternatives. Impacts from fugitive dust would still be similar for all alternatives as described under Alternative 1.

Alternative 4

The Alternative 4 route alignment is approximately 7.1 miles long. Emissions from heavy equipment and support vehicles would be similar to Alternatives 1, 2, and 3 as described under Alternative 1. Ground disturbance required for this alternative is estimated at 119 acres, which is greater than all alternatives except Alternative 2. Impacts from fugitive dust would still be similar for all alternatives as described under Alternative 1.

Mitigation Measures

Mitigation measures proposed for the Project to reduce criteria pollutant and fugitive dust emissions are proposed in Chapter 2, Table 2.4-4.

No Action Alternative

Under the No Action Alternative, the Project would not be constructed and no air quality impacts would occur.

4.8 TOPOGRAPHY, GEOLOGY AND SOILS

4.8.1 Introduction

This section describes the potential impacts from construction, operation, and maintenance of the Sunrise Tap Transmission Line Project to topography, geology, and soils. Mitigation measures proposed to minimize potential impacts are described in Chapter 2, Table 2.4-4.

Impacts to soils from the 230kV and 500kV transmission lines would be low to moderate, respectively. Construction of the 500kV alternatives would have short-term effects on geology and would not affect the maintenance and enhancement of long-term productivity. The Project would have a low impact on the availability of mineral resources in the area because of the relatively small area that would be affected.

4.8.2 Methods

Geologic and soil conditions were evaluated with respect to the impacts the Project may have on the local geology, as well as the impact-specific geologic hazards may have upon the Project.

Impacts of the Project on the geologic environment would be considered significant if the Project would:

- Expose people or property to hazards involving seismic events, landslides, or subsidence;
- Result in substantial soil erosion or loss of topsoil;
- Substantially alter the topography or ground surface relief beyond that resulting from natural erosion and deposition;
- Be located on expansive soils, creating a risk to people or property;
- Result in the loss of availability of a known mineral resource; or
- Conflict with mining claims or patents.

The impairment analysis for the geologic environment used the following criteria.

- *Low impact:* Impacts are measurable or perceptible, but localized in a relatively small area. The overall soil structure would not be affected.
- *Moderate impact:* Impacts would be localized and small in size, but would cause a permanent change in the soil structure in that particular area.
- *High impact:* Impact to the soil structure would be substantial, highly noticeable, and permanent.

4.8.3 Impacts and Mitigation Measures

230kV Transmission Lines – Sunrise-Equestrian (LV #3) and Sunrise-Clark (LV #1)

Impacts to the geologic environment from the proposed Sunrise-Equestrian 230kV transmission line (especially in undisturbed/exposed soil areas) would be similar to impacts from the 500kV transmission line alternatives (see below).

Soils along approximately 50 percent of the Sunrise-Equestrian 230kV transmission line are highly altered due to development and urbanization. Approximately 6,185 feet crosses map unit 134; a soil that has severe erosion potential and approximately 8,017 feet of soil map unit 415 which has moderate erosion potential. Where soils have not been altered by urbanization, moderate impacts are expected. Low impacts are expected where soils have been altered because of urbanization.

Soils along the Sunrise-Clark 230kV transmission line are highly altered due to urbanization of nearly the entire line route. Low impacts to soils are expected due to this pre-existing development. The Sunrise-Clark line would cross approximately 264 feet of map unit 134; a soil that has severe erosion potential.

500kV Transmission Line

Alternative 1

The construction activities associated with Alternative 1 would not have an effect on subsidence or landslide potential. The alternative would not affect groundwater levels in the area or induce overdraft conditions that could lead to land subsidence. Potential impacts to groundwater are

presented in Section 4.9. Structures would not create or exacerbate conditions that could induce a landslide during construction, because the structures would not be constructed in areas with steep slopes that could be subject to landslide activity.

The Project area may experience low to moderate levels of seismic activity due to the presence of several faults. The Project would be designed such that these potential impacts can be minimized during geotechnical investigations as part of the transmission line design.

The primary mineral resources along Alternative 1 are sand and gravel. Sand and gravel resources are abundant throughout Nevada, and the resources that may be located along the alternative are not unique. The two gravel pits within the Wetlands Park would not be impacted by construction or operation of the alternative. Soils used for backfill are abundant throughout Nevada and would be obtained from local sand and gravel operations. Mineral resources and mining activities are present in the Project area, but the alternative would not affect these resources or the potential for the resources to be mined in the future. There are no active mining claims filed under the Mining Act of 1872 listed in the U.S Department of Interior's (DOI) land status database. Therefore, mining claims would not be affected by the alternative.

The Project area is classified as having a moderate potential for development of oil and gas (BLM 1998). However, there are no active oil and gas leases on federal lands in the Project area listed in the DOI's land status database. No impact to these resources is anticipated as a result of the construction of Alternative 1.

Construction of the alternative components would have short-term environmental effects. Short-term uses of the environment, in this case, geologic environment, would not affect the maintenance and enhancement of long-term productivity. The Project would have a low impact on the availability of mineral resources in the area because of the relatively small area that would be affected.

Generally, the soils in the areas that would be affected by the alternative have low to moderate potential for water erosion and moderate to high potential for wind erosion. Disturbances to these soils during construction (excavation, grading, and possibly soil stockpiling) would create the potential for inducing soil erosion from storm water runoff and wind. These impacts would be reduced substantially through implementation of BMPs that would be required as part of compliance with local dust control ordinances, Clark County air quality permit requirements, and storm water pollution prevention plans.

Soil compaction could occur as a result of construction activities associated with the Project. Rubber-tired vehicles generally compact soils more than tracked vehicles. The extent of compaction would depend in large part on soil moisture content and the physical characteristics of a particular soil type. Compaction tends to be most severe when soils are moist to wet. Very dry and very wet soils generally would not compact as severely. Compaction impacts would generally be short-term in duration, but would have the potential to affect resources in the long-term. The topography and natural ground surface would be restored to its preconstruction condition following construction of the transmission line. Therefore, no impacts to topography would occur.

There are few areas of expansive soils in the Project area. The alternative would primarily be constructed in areas with low shrink-swell potential. For this reason, no impacts relating to expansive soils are anticipated.

Three soils types that exhibit moderate to severe erosion potential are crossed by Alternative 1:

Soil Map Unit	Soil Name	Erosion Potential	Ft. Crossed
134	Bracken gravelly fine sandy loam	Severe	2,685
415	Aztec very gravelly sandy loam	Moderate	19,886
419	Aztec-Bracken Complex	Moderate	2,850

Moderate soils impacts are expected for Alternative 1.

Alternative 2

Impacts to the geologic environment from Alternative 2 would be similar to impacts from Alternative 1 described above.

Three soils types that exhibit moderate to severe erosion potential are crossed by Alternative 2:

Soil Map Unit	Soil Name	Erosion Potential	Ft. Crossed
134	Bracken gravelly fine sandy loam	Severe	1,573
415	Aztec very gravelly sandy loam	Moderate	19,734
419	Aztec-Bracken Complex	Moderate	5,711

Alternative 2 would affect the least amount of soils with severe erosion potential compared to Alternatives 1, 3, and 4. The impact level to soils for Alternative 2 is expected to be moderate.

Alternative 3

Impacts to the geologic environment from Alternative 3 would be similar to impacts from Alternative 1 described above.

Three soils types that exhibit moderate to severe erosion potential are crossed by Alternative 3:

Soil Map Unit	Soil Name	Erosion Potential	Ft. Crossed
134	Bracken gravelly fine sandy loam	Severe	2,685
415	Aztec very gravelly sandy loam	Moderate	19,356
419	Aztec-Bracken Complex	Moderate	4,852

Impacts to soils expected from implementing Alternative 3 are moderate.

Alternative 4

Impacts to the geologic environment from Alternative 4 would be similar to impacts from Alternative 1 described above.

Three soils types that exhibit moderate to severe erosion potential are crossed by Alternative 4:

Soil Map Unit	Soil Name	Erosion Potential	Ft. Crossed
134	Bracken gravelly fine sandy loam	Severe	2,685
415	Aztec very gravelly sandy loam	Moderate	19,859
419	Aztec-Bracken Complex	Moderate	4,904

Impacts to soils expected from implementing Alternative 4 are moderate.

Mitigation Measures

Implementation of mitigation measures would reduce construction-related impacts to geology and soils from the Project. Mitigation measures identified for biological and visual impacts would also minimize impacts to geologic resources that may occur from road building, road improvement or general disturbance associated with construction activities. Restoration of the Project site would be completed in accordance with a project-specific Reclamation and BLM approved restoration plan. The restoration plan would address salvage of topsoil for reseeding purposes, re-contouring the natural land surface, treating weeds, and revegetating the disturbed areas.

Mitigation measures proposed to minimize or avoid potential impacts to topography, geology, and soils and from the Project are described in Chapter 2, Table 2.4-4.

No Action Alternative

The No Action Alternative would not have any impacts on the topography or the geologic or soil conditions of the Project area.

4.9 WATER RESOURCES

4.9.1 Introduction

This section describes the potential water resource impacts that could result from the construction, operation, and maintenance of the Sunrise Tap Transmission Line Project.

The Project would discharge storm water to the Las Vegas Wash during construction including a 5-mile segment below Telephone Line Road that is 303(d) listed as a impaired waters. Discharges would be short-term and would be minimized by complying with State storm water discharge requirements and mitigation measures proposed in Chapter 2, Table 2.4-4.

4.9.2 Methods

Potential impacts to water resources were evaluated based on the occurrence of water resources in the Project area in relation to construction, operation, and maintenance of the substations, 230kV transmission lines, and 500kV transmission line. Water resources impacts as a result of the Sunrise Tap Transmission Line Project would be considered significant if impacts would:

- Violate water quality standards or substantially degrade water quality;
- Deplete groundwater supplies or interfere substantially with groundwater recharge;

- Substantially alter existing drainage patterns of the area which would result in substantial increases in erosion, siltation, or surface runoff on or off-site;
- Have substantial adverse effects on federally protected wetlands as defined by Section 404 of the CWA through direct removal, filling, hydrological interruption, or other means; and
- Place structures within a 100-year flood hazard area as mapped by FEMA, which would impede or redirect flood flows.

4.9.3 Impacts and Mitigation Measures

Substations – Equestrian, Clark, Sunrise, Winterwood

The Project includes modifications to four existing substations: Sunrise, Winterwood, Clark and Equestrian. All modifications would occur within the existing substation sites and no ground disturbing activities (i.e., clearing and grading) would be necessary. No water resources occur at these substation sites, therefore there is no potential for impacts. Runoff from these areas during storm events would be controlled through the required permits and storm water management plans.

230kV Transmission Lines – Sunrise-Clark (LV #1) and Sunrise-Equestrian (LV #3)

The Project includes construction of two quad-circuit 230kV transmission lines. The Sunrise-Equestrian (LV #3) 230kV transmission line would connect the Sunrise Substation and the Equestrian Substation. Approximately 9 miles of existing 69kV transmission line would be replaced with 230kV line and 2.5 miles of new 230kV line would be constructed. The Sunrise-Clark (LV #1) 230kV transmission line would connect the Sunrise Substation and Clark Substation. Four miles of existing 69kV transmission line would be replaced with 230kV line and two new segments totaling 1.2 miles would be constructed.

The Sunrise-Clark (LV #1) 230kV transmission line does not cross any water resources identified in the Project area. No direct impacts to water resources would occur.

The Sunrise-Equestrian (LV #3) 230kV transmission line crosses the Las Vegas Wash and its associated floodplain (FEMA 2002) in two locations: immediately west of the City of Las Vegas Advanced Water Treatment Facility and at Pabco Road. At both these locations, NPC would span the Las Vegas Wash and floodplain if feasible to avoid directly impacting these resources and washout of structures during floods. If spanning would not be feasible, NPC would comply with Section 404 of the CWA and obtain the applicable permits from the U.S. Army Corps of Engineers. If single pole steel structures were sited in the floodplain, they would not impede or redirect flood flows.

A synthetic polymer emulsion palliative would be applied experimentally along the 2.5 mile new build portion of the Sunrise-Equestrian (LV#3) 230kV transmission line for dust control. The palliative may be transported to receiving waters through storm water runoff from the construction site. This type of palliative has been used at other locations in the Mojave Desert (i.e. Fort Irwin, CA) and is non-toxic to aquatic species (Midwest Industrial Supply, Inc. 2006). The palliative would be applied topically by qualified personnel according to manufacture instructions and would adhere to the Interim Policy on Dust Palliative Use in Clark County, Nevada. Water is also a limited resource in the Mojave Desert and the use of a palliative would reduce water use. The use of palliatives for dust control along the 230kV line would benefit water

resources through water conservation and is not anticipated to adversely impact water quality in nearby waters.

Construction of the 230kV transmission lines would require ground disturbance to clear and grade areas for structures, work areas, and access roads. Uncontrolled storm water runoff from these construction sites could transport sediment to the Las Vegas Wash which drains the Valley. Increased sediment loads and pollutant runoff to the Las Vegas Wash could degrade water quality. NPC would comply with storm water discharge requirements and obtain the applicable permit (NAC 445A.241) from the NDEP. NPC would implement Best Management Practices (BMPs) to control and minimize erosion and sediment runoff from construction sites during storm events protecting water quality in the Las Vegas Wash.

A 5-mile segment of the Las Vegas Wash downstream of the Project is a 303(d) Impaired Water Body due to total iron and TSS. Sediment in storm water runoff from the construction sites could contribute to total iron and TSS levels; however, these contributions would be low with the proper implementation of BMPs. Total Maximum Daily Loads (TMDLs) have not been developed for the Las Vegas Wash for total iron and TSS so there is no TMDL requirement for storm water discharge.

Operation and maintenance of the 230kV transmission lines would not impact water resources.

500kV Transmission Line

A new double circuit 500kV transmission line would be constructed from the HAM 500kV transmission line to a new 500kV yard within the existing Sunrise Substation. There are four alternative routes for the 500kV transmission line. Potential impacts to water resources are discussed by alternative below.

Alternative 1

The Alternative 1 route alignment is approximately 7.4 miles long. It does not cross any water resources identified in the Project area. No direct impacts to water resources would occur.

Ground disturbance from clearing and grading for structures, work areas, and access roads would disturb an estimated 111 acres; however, construction activities would be sequenced so that not all disturbance would occur at the same time. The Alternative 1 route is located to the north and northeast of the Las Vegas Wash and ranges in distance from directly adjacent where the wash has been channeled between Vegas Valley Drive and Desert Inn Road to over 6,500 feet. Uncontrolled storm water runoff from these construction sites could transport sediment to the Las Vegas Wash to the south. Increased sediment loads and pollutant runoff to the Las Vegas Wash could degrade water quality. NPC would comply with storm water discharge requirements and obtain the applicable permit (NAC 445A.241) from the NDEP. NPC would implement BMPs to control and minimize erosion and sediment runoff from construction sites during storm events protecting water quality in the Las Vegas Wash. The scrub community between the route and the wash would also provide a buffer and sediment runoff trap decreasing runoff velocities and sediment transport.

Operation and maintenance of the 500kV transmission line would not impact water resources.

Alternative 2

The Alternative 2 route alignment is approximately 7.0 miles long. It does not cross any water resources identified in the Project area. No direct impacts to water resources would occur.

Ground disturbance from clearing and grading for structures, work areas, and access roads would disturb an estimated 120 acres; however, construction activities would be sequenced so that not all disturbance would occur at the same time. The Alternative 2 route is located to the north and northeast of the Las Vegas Wash and ranges in distance from directly adjacent where the wash has been channeled between Vegas Valley Drive and Desert Inn Road to approximately 5,000 feet. Impacts from storm water runoff from Alternative 2 would be similar to Alternative 1.

Alternative 3

The Alternative 3 route alignment is approximately 7.0 miles long. It does not cross any water resources identified in the Project area. No direct impacts to water resources would occur.

Ground disturbance from clearing and grading for structures, work areas, and access roads would disturb an estimated 104 acres; however, construction activities would be sequenced so that not all disturbance would occur at the same time. The Alternative 3 route is located to the north and northeast of the Las Vegas Wash and ranges in distance from directly adjacent where the wash has been channeled between Vegas Valley Drive and Desert Inn Road to approximately 4,500 feet. Impacts from storm water runoff from Alternative 3 would be similar to Alternatives 1 and 2 as described under Alternative 1.

Alternative 4

The Alternative 4 route alignment is approximately 7.1 miles long. It does not cross any water resources identified in the Project area. No direct impacts to water resources would occur.

Ground disturbance from clearing and grading for structures, work areas, and access roads would disturb an estimated 104 acres; however, construction activities would be sequenced so that not all disturbance would occur at the same time. The Alternative 3 route is located to the north and northeast of the Las Vegas Wash and ranges in distance from directly adjacent where the wash has been channeled between Vegas Valley Drive and Desert Inn Road to approximately 4,500 feet. Impacts from storm water runoff from Alternative 4 would be similar to Alternatives 1, 2, and 3 as described under Alternative 1.

Mitigation Measures

Mitigation measures proposed for the Project to avoid and minimize impacts to water resources are described in Chapter 2, Table 2.4-4:

No Action Alternative

Under the No Action Alternative, the Sunrise Tap Transmission Line Project would not be constructed and no water resource impacts would occur.

4.10 HEALTH, SAFETY, AND NOISE

4.10.1 Introduction

This section describes the potential impacts from environmental contamination and hazardous materials, EMFs, non-EMF electric power field issues, and noise related to construction, operation, and maintenance of the Sunrise Tap Transmission Line Project.

Impacts to public health, safety, and noise from construction and operation of the Project would be low and temporary to short-term with the implementation of mitigation measures proposed in Chapter 2, Table 2.4-4.

4.10.2 Methods

Health and safety, and noise impacts were determined using information from environmental databases and applicable regulations, plans, and standards at the federal, state, and local levels.

Health and safety impacts as a result of the Project would be considered significant if impacts would:

- Result in soil contamination from construction;
- Mobilize existing soil contamination;
- Result in soil contamination from operation;
- Introduce hazards related to wind, earthquake, or fire;
- Interfere with radio/television/electronic equipment; or
- Induced currents or shock hazards to the public.

Noise impacts as a result of the Project would be considered significant if impacts would:

- Violate local noise standards;
- Cause excessive ground-borne vibration or ground-borne noise;
- Cause a permanent and substantially higher level of ambient noise; or
- Cause a substantially high level of temporary noise.

4.10.3 Impacts and Mitigation Measures

Substations - Equestrian, Clark, Sunrise, Winterwood

Substation modifications would occur within the existing boundary and fence line (property) of the substations as described in Section 4.1. Minimal amounts of hazardous materials consisting primarily of lubricating oils are used at the substations. Improper use and storage of these materials during facility operations could potentially result in spills or accidental releases causing contamination of oil or groundwater. This could potentially result in exposure of facility workers and the public to hazardous materials and environmental contamination. Existing Spill Prevention Control and Countermeasures (SPCC) Plans for the substations would be amended to include substation modifications. The amended plans and mitigation measures HSMM-3 and HSMM-4 would also be implemented to prevent and minimize potential impacts from spills or leaks of hazardous materials.

230kV Transmission Lines – Sunrise-Clark (LV #1) Sunrise-Equestrian (LV #3) and 500kV Transmission Line

This section summarizes health, safety and noise impacts associated with the 230kV transmission lines and 500kV transmission line alternatives. Impact discussion is common to both 230kV transmission lines and 500kV transmission line alternatives.

Health and Safety

During construction operations, hazardous materials such as vehicle fuels, oils, and other vehicle maintenance fluids would be used and stored in construction staging yards. There is potential for incidents involving release of gasoline, diesel fuel, oil, hydraulic fluid, and lubricants from vehicles or other equipment or the release of paints, solvents, adhesives, or cleaning chemicals

from construction activities. Improperly maintained equipment could leak fluids during construction activities and while parked. Spills and leaks of hazardous materials during construction activities could potentially result in soil or groundwater contamination. NPC would require that construction be performed in accordance with NPC's construction Storm Water Pollution Prevention Plan (SWPPP) (HSMM-2) to prevent and properly control accidental spills. Additional mitigation measures HSMM-3 and HSMM-4 described in Table 2.4-4 would further reduce potential impacts.

A synthetic polymer emulsion palliative would be applied experimentally along the 2.5 mile new build portion of the Sunrise-Equestrian (LV#3) 230kV transmission line for dust control. This palliative is considered non-hazardous; however, improper use or overexposure can cause adverse health effects (Midwest Industrial Supply, Inc. 2006). The palliative would be applied topically by qualified personnel according to manufacture instructions and would adhere to the Interim Policy on Dust Palliative Use in Clark County, minimizing the potential for adverse health effects.

Based on a limited environmental hazardous materials review conducted for the Project area, no known NPL or CERCLIS sites are located along the proposed 230kV or 500kV transmission line routes (Figure 3.10-1). However, four CERCLIS sites are located within the general vicinity of the transmission lines and the NDEP list also identified leaking underground storage tank sites (petroleum) in Clark County that may exist in the urban areas of the Project. Encountering known pre-existing soil or groundwater contamination would be unlikely since NPC would avoid construction in known contaminated sites and excavation would be limited to areas of transmission structure installation.

Unknown pre-existing contaminated soil sites could be encountered during grading or excavation, particularly at or near commercial and industrial areas. If contaminated soils are observed during construction, work would be halted until the proper agencies are notified.

Soil or groundwater contamination could result from accidental spill or release of hazardous materials at the substations during facility operation or along the transmission line during maintenance operations. This could potentially result in exposure of facility workers and the public to hazardous materials. However, adherence to the SPCC plans for the substations and implementation of mitigation measures HSMM-2, HSMM-3, and HSMM-4 would ensure that potential impacts from spills or leaks of hazardous materials during substation and transmission line maintenance and operation are minimized.

A large conducting object that is well insulated from the ground might present an opportunity for a perceptible shock if it is in a strong enough electric field. Since electrical induction effects generally increase with the size of the object, there could be perceptible currents or sparks caused by the Project interacting with these structures. However, such objects are often naturally grounded, which would considerably reduce the magnitude of currents or sparks that a person can receive due to electric field induction. Buildings, storage sheds, and other large conducting objects would not be permitted within the ROW. NPC would properly ground fences that cross the ROW per NPC engineering construction standards to eliminate problems of induced current.

Recent studies have concluded that EMF do not themselves have the energy to directly cause cellular DNA damage that lead to leukemia or other cancers (Lloyd 2003). However, in light of some uncertainty, NPC designs and constructs their circuits to reduce EMF to the maximum extent feasible.

Wind, earthquake, and fire hazards are addressed in project design. NPC is required to design the transmission line infrastructure in accordance with National Electrical Safety Code (NESC) requirements. As a result, no design related hazards would occur.

Corona or gap discharges related to high frequency radio and television interference impacts are dependent upon several factors, including the strength of broadcast signals. If these corona or gap discharges occur, they are anticipated to be localized. If individual sources of adverse radio or television interference occur as a result of the Project, they can be located and corrected on the power lines. Conversely, magnetic field interference with electronic equipment such as computer monitors can be corrected through the use of software, shielding, or changes in the monitor location. Mitigation measure HSMM-4 would minimize impacts.

Noise

Construction noise would occur from the operation of heavy equipment such as dozers and backhoes. Noise levels would vary for different construction activities with maximum levels expected during dozer operation. Noise generation would be intermittent over the short-term.

The construction of the project may also require blasting, impact-pile driving, and implosive conductor connectors. Blasting and impact-pile driving would cause intermittent noise and ground-borne vibration impacts at close distances. Ground-borne noise or vibration would attenuate rapidly from the source and would not be perceptible outside of the construction areas. Implosive connectors are used to connect overhead high voltage transmission lines using implosive energy rather than hydraulic compression. No equipment is needed for installation so the area of ground disturbance is reduced from that required for conventional hydraulic compression. The implosion sounds like a shotgun being fired but lasts for only an instant. Local residents would be notified prior to blasting and implosions to avoid startling them (Table 2.4-4, NMM-1).

The City of Henderson and Clark County have ordinances that specifically restrict construction activities during night-time hours. NPC would comply with these ordinances (Table 2.4-4, NMM-2) which would reduce the short-term noise impact associated with construction noise levels.

On Wetlands Park lands, potential sensitive receptors in the area include recreational users along trails and other areas in the vicinity of the proposed transmission lines. Construction of the Project would result in temporary increases in ambient noise levels; however, NPC would coordinate with the authorized officer of the Wetlands Park to schedule construction activities outside heavy recreational use periods reducing impacts (Table 2.4-4, NMM-3).

No Action Alternative

Under the No Action Alternative, the Project would not be constructed and no impacts to health, safety, and noise would result. Hazardous materials would continue to be stored, handled, and disposed of appropriately at the existing Equestrian, Clark, Sunrise and Winterwood Substations. Therefore, no impact would result.

4.11 SOCIOECONOMICS

4.11.1 Introduction

This section describes the potential socioeconomic impacts that could result from the Sunrise Tap Transmission Line Project.

The Project would benefit the economy over the long-term by maintaining reliable electric power service for the growing number of residences and industries in the region. Construction activities would be short-term and would not impact existing or future population growth levels and would not require additional housing in the project area or replacement housing elsewhere. The Project would not result in environmental justice impacts.

4.11.2 Methods

Significant impacts to socioeconomics would occur if the Project would:

- Induce substantial population growth in an area either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure);
- Induce substantial population growth or the need for additional housing in an area through the required labor force; or
- Displace substantial numbers of existing housing or persons necessitating the construction of replacement housing elsewhere.

4.11.3 Impacts and Mitigation Measures

230kV Transmission Lines – Sunrise-Equestrian (LV #3) and Sunrise-Clark (LV #1)

Construction activities would primarily occur within or adjacent to an existing utility ROW. No residences or businesses would be permanently displaced as a result of Project construction.

Economic Impacts

The Las Vegas area's population and economy is large, diverse, and dynamic; therefore, the economic effects of constructing the transmission line would have little discernable effect on the overall levels of personal income and employment in the region. Accordingly, the Project would make a relatively small contribution to the overall economy of the region. More substantially, the Project would benefit the economy over the long-term by maintaining reliable electric power service for the growing number of residents and industries in the region.

Apart from the benefits of reliable service to customers in general, benefits would also accrue to jurisdictions along the route in the form of property taxes. Payments would also be made to federal jurisdictions providing ROW easements.

Some positive effects would also result during construction, not only in the form of direct employment, but also from procurements of construction materials and services from local suppliers and businesses.

Impacts on Population and Housing

Construction activities resulting from Project implementation would be short-term and would not impact existing or future population growth levels.

The figure of merit for assessing the construction phase's socioeconomic impacts is population. Population was delineated in terms of the census tracts as part of the Chapter 3 inventories through or along which the Project is located. The Project would be constructed on City of Las Vegas, City of Henderson, Clark County, private, and federal property. Minority or low-income

populations are found in most census tracts in the Project area, but the population consists of primarily non-minority people living above low-income levels. There are no population groups in the Project area that are considered to be predominantly minority or low income.

It is anticipated that the majority of workers would come from the Las Vegas Valley area, with the possible exception of some outside contract labor. With temporary housing (e.g., motel, hotels, apartments, etc.) readily available, the Project would not adversely affect existing housing; therefore, the project would not cause a demand for housing that could not be accommodated by existing temporary housing in the Project area.

Impacts to population and housing in the Project area would be minor based on the foregoing discussion. The Project would not displace any existing residences in any location causing the construction of replacement housing elsewhere, displace a substantial number of people from any location causing the construction of replacement housing elsewhere, or induce substantial population growth in the Project area directly or indirectly.

Environmental Justice

The purpose of an environmental justice analysis is to determine whether adverse environmental impacts would disproportionately affect minority and low-income communities compared to other communities in the project area. Impacts related to environmental justice would be significant if environmental justice populations exist in the affected area, and those populations are disproportionately affected by adverse impacts compared to other population groups.

None of the census tracts in the study area contain predominantly minority or low-income population groups; therefore there would be no environmental justice impacts from implementation of the Project. There would be no direct or indirect impacts to minority or low-income populations as a result of the Project. Therefore, mitigation would not be required.

Impacts on Public Services

Impacts on public services such as sewer, water, schools, police, or fire are expected to be minor. The most direct potential demands would likely be incidents of fire, worker accidents at the Project site, oil or hazardous materials events, or construction material theft and vandalism. Such events are highly unlikely.

Hazardous waste emergency response teams with procedures in place would cover the Project site. Similarly, the Project area is under the jurisdiction of local fire districts and police protection, as well as for emergency medical services, should such needs arise. NPC would work with County and City Public Works Departments regarding construction schedules and work along roadways. Furthermore, procedures would be in place on-site to provide best management practices for health and safety, and can be considered effective measures.

500kV Transmission Line

Construction activities would occur outside or adjacent to an existing utility ROW. No residences or businesses would be permanently displaced as a result of Project construction. Impacts from the 500kV transmission line alternatives would be similar to those described above for the Sunrise-Equestrian and Sunrise-Clark 230kV transmission lines.

Mitigation Measures

Proposed mitigation measures to avoid or reduce environmental impacts and protect public safety along the transmission line ROWs would greatly reduce disturbances to daily living patterns occasioned by construction activities. Mitigation measures proposed for these resources would also minimize impacts to the public. As such, no additional socioeconomic mitigation for the Project is recommended.

No Action Alternative

The Project would not be constructed under the No Action Alternative. Future employment and economic effects associated with the No Action Alternative are expected to remain consistent with historic trends of the local economy. The project need would not be met and an electrical system of adequate capacity and reliability would not be maintained potentially having adverse impacts on the areas economy.

4.12 CUMULATIVE EFFECTS

4.12.1 Introduction

Cumulative impacts result “from the incremental impact of an action when added to other past, present and reasonably foreseeable future actions.” The impacts of past and present actions combine to form existing conditions considered in the Affected Environment sections of Chapter 3.

Potential cumulative impacts to the environment were addressed that could be associated with the implementation of the Project in conjunction with one or more past, present, or reasonably foreseeable future actions or projects. Reclamation’s Draft NEPA Handbook states that “cumulative impacts can be categorized as additive and interactive. An additive impact emerges from persistent additions from one kind of source whether through time or space. An interactive impact results from more than one kind of source.” Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Cumulative impacts are most likely to arise when a relationship exists between a proposed alternative and other actions that have, or are expected, to occur in a similar location or time period, or involve similar actions. Projects in close proximity to the Project and alternatives would be expected to have more potential for cumulative impacts than those more geographically separated.

4.12.2 Impact Assessment Methods

The geographic area for this cumulative impact analysis is defined as the area of visual influence based on the BLM VRM System of the Sunrise Tap Transmission Line Project (Figure 4.12-1). The visual area of influence of the Project was determined to have the most long-term effect and encompass the largest geographic area compared to other affected resources in the Project area. The pink identifies the area where the 150 foot tall 500kV transmission line structures can be seen, the blue identifies the area where the 120 foot tall 230kV transmission line structures can be seen, and the purple identifies the area where both the 500kV and 230kV transmission line structures can be seen. The geographic area encompasses all three colored areas for a total of approximately 66,295 acres.

Figure 4.12-1 Visual Influence Area
See CD

Past, present, and reasonably foreseeable future and similar-type actions that are linear in nature were identified within this geographic area and are presented in Table 4.12-1. Actions considered to be “past” are projects that have occurred within the last 10 years. The greater Las Vegas Valley is one of the fastest growing areas in the United States. A 10-year timeframe is appropriate for this analysis since 1997 was the origination of the SNPLMA which spurred the development and growth of the Las Vegas Valley. Actions considered to be “present” are defined as actions occurring at the time of this evaluation that would continue during construction of the Proposed Action. Actions considered to be “future” are projects that are currently in the planning stages and would reasonably occur in the foreseeable future over the next 10 years. These actions were identified from BLM correspondence and the environmental documents listed below:

- SCOP EA for Proposed Project Changes on Bureau of Reclamation Administered Land (Reclamation 2008)
- Proposed Highway Projects for FY 2008, Clark County (NDOT 2008)
- Southern Nevada Transmission Master Plan (NPC 2008)

Table 4.12-1 Past, Present, and Future Actions and Estimated Acres of Disturbance

Project	Estimated Ground Disturbance (acres)
Past	
Harry Allen - Mead 500kV Transmission Line	58
Navajo – McCullough 500kV Transmission Line	52
IPP DC Line	48
Lake Mead Parkway	70
Boulder Highway	159
City of Henderson Water Reclamation Facility Expansion	23
SNWA East Lateral Pipeline	190
Past Total	600
Present	
Wetlands Park Trails	373
City of Henderson Water Reclamation Facility Expansion	78
SNWA ECS	52
Present Total	503
Future	
Systems Conveyance and Operations Program (SCOP)	67
Lake Mead Parkway Expansion	35
Future Total	102
Sunrise Tap Transmission Line Project	
Proposed Action (Preferred 500kV line, 230kV lines, and substations)	259
No Action	0

Of the projects in Table 4.12-1, the SNWA East Valley Lateral Pipeline, Wetlands Park Trails, SCOP Alignment Adjustment, and SNWA erosion control structures occur in close proximity to the 500kV and Sunrise-Equestrian 230kV components of the Project along the north side of the

Las Vegas Wash. The 500kV alternative Routes 1, 3, and 4 follow the SNWA pipeline road (Figure 2.2-1). These projects would have a greater potential for cumulative impacts than those more geographically separated.

Harry Allen – Mead 500kV Transmission Line

The Harry Allen – Mead 500kV transmission line was energized on March 6, 2007. The line is 48 miles long and begins at the Harry Allen substation near the Apex Generating Station and ends at the Mead substation which is approximately 7 miles southwest of Lake Mead. Approximately 9 miles of the line crosses the Sunrise Tap Project area of visual influence (Figure 4.12-1). This transmission line, as well as the Navajo – McCullough and IPP DC transmission lines described below; were sited within a federally designated corridor identified for linear utilities, and included as a designated corridor in the BLM Las Vegas Field Office Resource Management Plan of 1998 which designates allowed land uses within the federal corridor.

Navajo – McCullough 500kV Transmission Line

The Navajo-McCullough 500kV transmission line starts at the Navajo Generating Station located near Page, Arizona interconnects at Crystal substation (Navajo-Crystal) in Las Vegas and continues to the McCullough (Crystal-McCullough) substation approximately 20 miles south of Las Vegas west of Hwy 95. Approximately 9 miles of the line crosses the Sunrise Tap Project area of visual influence and runs parallel to the Harry Allen – Mead 500kV line (Figure 4.12-1). This line was originally energized in the late 1970's which is outside the cumulative timeframe for this analysis, but was specifically requested to be included by BLM.

IPP DC Line

The IPP DC transmission line is a 488 mile 500kV line between the Intermountain power plant in Utah and the Adelanto static inverter plant near Adelanto, California. The line runs parallel to the Navajo – McCullough and Harry Allen – Mead 500kV transmission lines for approximately 9 miles within the Sunrise Tap Project area of visual influence (Figure 4.12-1). This line was originally energized in the late 1980's which is outside the cumulative timeframe for this analysis, but was specifically requested to be included by BLM.

Boulder Highway

The Boulder Highway is a six lane highway which begins at Interstate 515 west of Boulder City and runs northwest through the town of Henderson and ends at the intersection of E. Sahara Avenue and Fremont Street in Las Vegas. It is approximately 17 miles in length and was constructed more than 10 years ago. This highway is used primarily by local traffic. The Boulder Highway disturbs approximately 159 acres within the project's visual area of influence (Figure 4.12-1).

Lake Mead Parkway

The Lake Mead Parkway (SR 564) is a four lane divided highway which begins at Interstate 515 on the west side of the City of Henderson and runs east through Henderson and then turns northeast and ends at the Lake Mead National Recreation Area (NRA). The Lake Mead Parkway is approximately 9 miles in length and was constructed more than 10 years ago. This parkway is used primarily by local traffic. The Lake Mead Parkway disturbs approximately 70 acres within the project's visual area of influence (Figure 4.12-1).

The Lake Mead Parkway is scheduled to be widened from four lanes to six lanes from Boulder Highway to Lake Mead NRA as per the NDOT proposed highway projects for FY 2008 (NDOT 2008). This expansion would disturb approximately 35 additional acres within the project's visual area of influence.

City of Henderson Water Reclamation Facility (WRF) Expansion

The City of Henderson WRF expansion is currently under development on 101.3 acres of vacant land to the east of the existing WRF. The expansion includes the construction of new facilities and improvements to current infrastructure including reclaimed water pumping station, chemical building, contact basins, and additional distribution piping. Construction is scheduled for completion in 2009.

SNWA East Valley Lateral Pipeline

The SNWA constructed and completed the East Valley Lateral Pipeline in 2000. This pipeline was constructed to transport raw water from the AMSWTF to the River Mountains Treatment Facility. The East Valley Lateral is a 78-inch-diameter pipeline that crosses below the Las Vegas Wash. Its alignment is approximately 2,000 ft north of the SCOP pipeline alignment. The East Valley Lateral project resulted in long-term, adverse, minor impacts to biological resources and cultural resources. These impacts were the result of increases in surface disturbance resulting in loss of available habitat and vegetation cover, and disturbance to cultural sites. The construction of the East Valley Lateral Pipeline also included the installation of a new, permanent access road along the alignment. This access road provides the public with additional means to enter the Project area.

Wetlands Park Trails

Construction activities at the Wetlands Park are estimated to be complete by 2015. The Clark County Wetlands Park Master Plan defines strategies for creating a system of trails, interpretive exhibits, and picnic areas along the Las Vegas Wash. It also includes a visitor center (i.e., Nature Center) with educational information and specific site improvements such as landscape design, building concepts, and roadway and parking concepts. The planned Wetlands Park trails and facilities would potentially disturb approximately 384 acres of land within the Wetlands Park boundary.

SCOP Alignment Adjustment

The Clean Water Coalition (CWC), which is comprised of agencies currently responsible for wastewater treatment in the Las Vegas Valley: City of Las Vegas, City of North Las Vegas, City of Henderson, and Clark County Water Reclamation District have proposed the SCOP. The SCOP will provide an alternate discharge location for the effluent, which is currently discharged to Lake Mead through the Las Vegas Wash. A 6,050-foot segment of the Reach 3 alignment would be constructed using cut-and-cover techniques and would begin on the north side of the Vegas Wash at the City of Henderson connection to the effluent interceptor, near the Pabco Road erosion control structure, and continue in a northeasterly direction terminating at the Reach 3 Tunnel portal shaft.

SNWA Erosion Control Structures (ECS)

The SNWA has plans to construct additional ECSs along the Las Vegas Wash through 2015. The ECSs are designed and constructed to manage and reduce the impacts of storm flows on the Las Vegas Wash. Bank stabilization activities are also occurring in the Las Vegas Wash. The ECSs have reduced erosion by aiding in the stabilization of the Las Vegas Wash. Additional ECSs are planned and will further reduce the impacts of erosion in the Las Vegas Wash and Inner Las Vegas Bay.

4.12.3 Cumulative Effects on Environmental, Cultural, and Human Resources

The following subsections identify cumulative effects to environmental, cultural, and human resources.

Land Use, Recreation, and Transportation

The projects identified in Table 4.12-1 are associated with the continued growth of the Las Vegas Valley and fast rate of urbanization of the rural landscape. Conversion of rural landscapes to urban areas has reduced the quantity of lands available for other uses such as open space and wildlife habitat. A detailed analysis of cumulative impacts to biological resources is provided below.

Access to some areas within the Clark County Wetlands Park may be restricted during specific phases of construction of the Wetlands Park Trails, SNWA ECS, SCOP alignment adjustment and 230kV Sunrise-Equestrian component of the Proposed Action. Any access restrictions would be temporary and would not change the land use in the area, and restrictions would be removed once construction is complete. Therefore, cumulative impacts to recreation access would be short-term.

The Lake Mead Parkway and Boulder Highway have benefited local transportation in the cities of Las Vegas and Henderson. Expansion of the Lake Mead Parkway will allow for increased traffic volumes. Construction activities associated with present and future projects in Table 4.12-1 would generate additional traffic on regional and local roadways; however, it would be dispersed over the entire geographic area and over time during different construction phases. Therefore, cumulative impacts to traffic would be short-term.

Additional roads as a result of the projects identified in Table 4.12-1 would impact land use by increasing the access opportunities to areas previously inaccessible or less accessible to motorized vehicles. Increased access can lead to increased recreational activities such as off-road vehicle use. This increased use would impact the ability of land managers to successfully preserve the archaeological, cultural and natural resources of the area.

Visual Resources

Specific visual impacts from the Project would likely be reduced through mitigation in the type and color of structures selected. Many of the structures would be located in or adjacent to utility corridors and ROWs that have been classified for these types of facilities. However, the projects identified in Table 4.12-1 have or would add considerable amounts of manmade elements to the environment. These manmade elements would cumulatively impact the visual resources of the area by introducing contrast to the existing natural landscapes.

The significance of the cumulative impact would depend on the level of visual contrast between the existing surroundings and the Project and whether the scenic quality of the surroundings would be diminished. The Project in conjunction with the other projects discussed above involving the addition of constructed objects into natural settings could cause cumulative impacts to residential viewers, highway viewers and to some recreation viewpoints in several areas. The route would have cumulative effects on scenic quality where it parallels existing transmission lines or is adjacent to housing developments, commercial and industrial facilities and other utility facilities within the Las Vegas Valley.

The 500kV alternatives would cause minor additions to the present level of cumulative impacts to the viewsheds of Lake Las Vegas and Lake Mead NRA. The viewsheds of these locations are already highly impacted by the cumulative effects of the Harry Allen-Mead 500kV transmission line, the Navajo-McCullough 500kV transmission line, and the IPP DC line.

The viewsheds of the nearby Weston Hills and Tuscany residential developments are presently heavily impacted by the cumulative effects of surrounding development in the Las Vegas Valley, in addition to long-term cumulative impacts from the City of Henderson Water Reclamation Facility expansion, the Harry Allen – Mead 500kV transmission line, the Navajo – McCullough 500kV transmission line, the IPP DC line, the Wetlands Park Trails, and the Lake Mead Parkway. The 500kV alternatives would be expected to cause a moderate increase in cumulative effects for the viewsheds of these developments due to the general lack of current viewshed impacts to the north, where the Project would be viewed in a relatively natural setting. The 230kV Sunrise-Equestrian route would also cause a moderate increase in cumulative impacts to both the Weston Hills and Tuscany residential developments due to its location in the immediate foreground of the developments, where no other existing projects are located.

The viewshed of the Lake Mead Parkway is currently heavily impacted by the cumulative effects of surrounding development in the Las Vegas Valley, in addition to long-term cumulative impacts from the City of Henderson Water Reclamation Facility Expansion, the Harry Allen – Mead 500kV transmission line, the Navajo – McCullough 500kV transmission line, and the IPP DC line. The 230 kV Sunrise-Equestrian line would cause a moderate increase in cumulative impacts where it crosses the Parkway. The 500kV alternatives would cause minor additional to the present level of cumulative impacts to the viewshed of the Parkway.

Due to the close proximity of the Project to the SNWA Pipeline, Wetlands Park, SCOP, and SNWA ECS projects and potential overlap in construction timing, cumulative short-term visual impacts are expected. These impacts would result from exposed soils, vegetation clearing, and construction equipment and activities.

Long-term cumulative impacts are not expected as a result of these nearby projects. The SNWA East Valley Lateral Pipeline and the SCOP Alignment Adjustment are underground and therefore will not contribute to long-term cumulative visual impacts. The SNWA Erosion Control Structures project is also not expected to contribute to long-term cumulative impacts. An access road constructed as part of the SNWA Pipeline would be utilized for access to construct the 500kV alternatives, eliminating the need for construction of a new access road and thus reducing long-term cumulative impacts. The Wetlands Park Trails, while introducing additional clearing and built elements to the landscape, is expected to make only a minimal contribution to cumulative impacts due to the small scale of the elements and their compatibility with the Wetlands Park landscape.

Biological Resources

Cumulative effects on biological resources are generally additive and proportional to the amount of ground disturbance within specific habitat areas. The area of ground disturbed from all projects within the cumulative impact area (Figure 4.12-1) from past, present and future projects (Table 4.12-1) represents 1,464 acres or 2.2 % of the cumulative impact area (66,295 acres). The Sunrise tap project would disturb 0.4% of the cumulative impact area but would represent a 21.5% increase in total cumulative disturbance. Under the assumption that all ground disturbances would remove native habitat, biological resource would therefore experience a 21.5% increase in ground disturbance representing 0.4% habitat disturbance in the cumulative impact area.

The Clark County Department of Comprehensive Planning in cooperation with the USFWS has addressed the cumulative effects on biological resources for development and construction activities on a countywide basis. As a result, the MSHCP was developed to address sensitive and protected biological resources on private and public lands in Clark County.

The development of energy facilities with their emphasis on utility line infrastructure on public lands may potentially impact some sensitive species. Impacts may also be elevated due to concurrent projects occurring in the same area. Projects identified in the area of the Sunrise Tap project are listed in Table 4.12-1 and specifically include: SNWA East Valley Lateral Pipeline, Wetlands Park Trails, SCOP Alignment Adjustment, and SNWA erosion control structures. Sensitive species in the Las Vegas Valley that are covered under the MSHCP include several species of plants and animals, as discussed earlier in Chapters 3 and 4 of this EA. Some of these species are also federally listed as threatened or endangered. Mitigation measures would be implemented to lessen or eliminate potential impacts to biological resources.

Flora and fauna in the cumulative impact area would lose native habitat equating to approximately 2.2% of the entire cumulative impact area (assuming the entire amount of disturbance would occur in native habitat, a conservative estimate). Rare and sensitive species would likely experience the greatest impact, due to specialized niches required for their existence. The Las Vegas bearpoppy population in the cumulative impact area is greater than 14,000 known plant locations. There are 2,951 known Las Vegas bearpoppy locations along the proposed 230kV and 500kV transmission line routes. This represents approximately 20% of the known Las Vegas bearpoppy occurrences in the cumulative impact area. Mitigation measures (i.e. preconstruction surveys and avoidance) would reduce direct mortality to Las Vegas bearpoppy plants in the transmission line ROW. Mitigation measures implemented during construction of the Harry – Allen Mead 500kV transmission line reduced actual take of Las Vegas bearpoppies to a minimum. Additional botanical surveys would identify areas for avoidance during construction. Habitat for the sensitive Gila monster, western burrowing owl, and riparian species would also be reduced by 2.2%, cumulatively. Riparian habitat loss would occur along the washes and drainages in the cumulative impact area. A summary of general cumulative impacts to flora and fauna is discussed below in relationship to past, present and future projects.

Short-term impacts from construction (i.e. noise, dust, human activity) from the Sunrise Tap project and Wetlands Park Trails, SCOP Alignment Adjustment, and SNWA erosion control structures would all occur to some extent along the Las Vegas Wash. Breeding birds utilize this habitat; specifically the southwestern willow flycatcher, Yuma clapper rail, and yellow-billed cuckoo (all protected under ESA) have been documented as transient residents along the wash. Construction timing sensitive to breeding periods along with preconstruction surveys would reduce impacts to avian species from these activities.

In general, constructing transmission lines can result in minimal long-term effects to both botanical and wildlife species. Concentrated developments such as mines, shopping malls, residential development or parking lots often require extensive ground disturbance. However, transmission lines are often constructed in desert environments with little grading except for roads needed for construction and line maintenance over the life of the project. Areas around transmission structures need only be graded if relatively flat areas are not available for construction workers and equipment to assemble and erect the structures.

Speed limits are imposed on these roads to limit dust and protect special status species (e.g., desert tortoise). New roads would not be constructed where roads exist or where a new transmission line is located adjacent to an existing line. Spur roads (short road segments from an existing road to the structure locations) are favored in such cases.

Long-term direct impacts to plants and animals can be attributed to habitat fragmentation caused by new access roads. An existing access road along the SNWA East Valley Lateral Pipeline will be utilized for constructing the proposed 500 kV line. Existing roads would be utilized where possible and thus reduce further fragmentation and other potential impacts to biological resources. The botanical and wildlife habitat in Clark County is being increasingly fragmented by new development, causing populations to be separated from critical food and water sources and other populations of the same species.

Opening up areas to casual vehicular access by the public causes indirect impacts. Increased hunting, wildlife harassment, vehicle collisions and spread of noxious weeds can result in areas that had previously been unroaded. Multiple construction projects have occurred or are proposed in close proximity to the Sunrise Tap Transmission Line project. Cross utilization of construction roads would be encouraged, as well as the existing road network. Minimizing new road construction and controlling public access where possible would reduce cumulative impacts associated with the Sunrise Tap and other projects proposed in the area. Other indirect effects to wildlife resulting from the construction of the Sunrise Tap project include the addition of perching and/or nesting structures for birds that may prey on juvenile tortoises and other sensitive species.

Increasing access to wildlife habitat areas also increases the chances for human/wildlife encounters and conflicts on the fringes of the Las Vegas Valley. The Sunrise Tap Transmission Line project would utilize existing roads where feasible. Increased access roads from construction would potentially increase public access. Human access would also potentially be increased from the SNWA East Valley Lateral Pipeline and Wetlands Park Trails project. Unwelcome wildlife encounters and increased public access lead to an increased work load for wildlife managers who must deal with resolving these conflicts both on an individual basis and on a large scale, through negotiations and consultation with other government agencies and private corporations (NDOW 2003).

A Restoration Plan, as part of the Final Plan of Development, would include mitigation measures to reduce or eliminate impacts to biological resources. Mitigation measures would include consideration of direct and indirect impacts for the proposed project as well as cumulative impacts from adjacent proposed actions.

Cultural Resources (Historic Properties)

Because an intensive pedestrian inventory of the Proposed Action has not yet been conducted, the exact number, type, and significance of cultural resource sites that would be disturbed by the project is not yet known. Moreover, the literature search that has been completed did not cover the entire visual influence area of the Sunrise Tap Project so the total number of sites in the area of visual influence is not known. However, based on the data from previous projects in the area, some estimates can be provided. Approximately 35 previously identified sites are located within the approximately 1,122 acres of the Sunrise Tap alignments that have been previously inventoried. Of these 35 previously identified sites, only 14 are considered NRHP-eligible or unevaluated and included in the cumulative effects analysis. This is an effective site density of approximately 1 site every 33 acres and approximately 1 NRHP-eligible site every 80 acres. Thus, if we extend this site density to the 1,205 acres of ground disturbance from past, present, and future projects, we estimate that approximately 38 sites may have been or would be affected by the projects in Table 4.12-1. Of these sites, we estimate that only 15 would have been NRHP-eligible. Therefore, approximately 29 NRHP-eligible sites have or would be cumulatively affected by past, present, and future projects and the Sunrise Tap Transmission Line Project.

Construction and installation of the transmission line in concert with other past, present and future projects would contribute to cumulative damage to cultural resources. Surface disturbance from ground-disturbing construction activities and new and improved access roads would allow for disturbance of prehistoric and historic properties that are fragile and non-renewable resources. Opening up areas to vehicular access by the public can cause indirect cumulative impacts to cultural resources through illegal “pot hunting” and inadvertent damage to these sites. Other projects in the area such as the SNWA East Valley Lateral Pipeline have had similar effects on cultural resources. Construction of the SNWA East Valley Lateral Pipeline included a pipeline corridor and new access roads, which provides the public with access to cultural resources. Creation of the Wetlands Park Trails system may also contribute to cumulative impacts on cultural resources. The Wetlands Park is located in close proximity to the Las Vegas Wash Archaeological District. With the construction of the trail system in the Wetlands Park, more people may be in closer proximity to cultural resources than previously, with a concomitant increase in the possibility of looting and site destruction.

In contrast, some projects in the area may help preserve cultural resources. The SCOP Alignment Adjustment may reduce erosion within the Las Vegas Wash. This may help protect the numerous cultural resources located along the margins of the wash. The same is true for the SNWA ECS. Reduction of erosion along the Las Vegas Wash is highly likely to help preserve some cultural resources that might otherwise be destroyed by natural forces.

The City of Henderson WRF Expansion is a small expansion of existing facilities and is not located in close proximity to currently known cultural resources. The Reclamation Facility Expansion Project is unlikely to contribute to cumulative effects on cultural resources.

Additionally, transmission lines located mostly within an existing utility corridor minimize new impacts to undisturbed sites. This includes past projects such as the Harry Allen – Mead, Navajo – McCullough, and IPP DC line. The Sunrise Tap Project and other future projects in the Las Vegas Valley would be required to consult with appropriate agencies and tribal representatives and provide appropriate mitigation for the discovery and collection of important cultural resources. Therefore, the Project would not contribute measurably to cumulative impacts on these resources.

Paleontological Resources

The paleontological literature search conducted for this Project did not cover the entire visual influence area of the Sunrise Tap Project so the total number of paleontological localities in the area of visual influence is not known. However, based on the data from the current file search, some estimates can be provided. The Project would disturb approximately 259 acres of ground surfaces, some of which may include paleontological localities, in addition to 1,205 acres of ground disturbance from similar past, present, and foreseeable future projects listed in Table 4.12-1 that may include paleontological localities. Total cumulative ground disturbance comprises only 2.2% of the Sunrise Tap Project area of visual influence.

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. In general, for scientifically significant paleontological resources that are present within the study area, the potential cumulative impacts would be low, so long as mitigation was implemented to avoid or salvage the resources. The mitigation measures proposed for the project would effectively recover the value to science and society of significant fossils that would otherwise have been destroyed by surface disturbing actions.

Other projects in the area such as the SNWA East Valley Lateral Pipeline included a pipeline corridor and new access roads, which provides the public with access to paleontological localities. Creation of the Wetlands Park Trails system may also contribute to cumulative impacts on paleontological resources. The Wetlands Park is located in close proximity to paleontological localities. With the construction of the trail system in the Wetlands Park, more people may be in closer proximity to sources of fossils than previously, with a concomitant increase in the possibility of illegal collecting and destruction.

In contrast, some projects in the area may help preserve paleontological resources. The SCOP Alignment Adjustment may reduce erosion within the Las Vegas Wash. This may help protect the fossils located along the margins of the wash. The same is true for the SNWA ECS. Reduction of erosion along the Las Vegas Wash is highly likely to help preserve some fossils that might otherwise be destroyed by natural forces.

Additionally, transmission lines located mostly within an existing utility corridor minimize new impacts to undisturbed sites. This includes past projects such as the Harry Allen – Mead, Navajo – McCullough, and IPP DC line. The Sunrise Tap Project and other future projects in the Las Vegas Valley would be required to consult with appropriate agencies and provide appropriate mitigation for the discovery and collection of important paleontological resources. Therefore, the Project would not contribute measurably to cumulative impacts on these resources.

Air Quality

Some phases of construction of the Wetlands Park Trails, City of Henderson WRF Expansion, SNWA ECS, and proposed SCOP and Lake Mead Parkway expansion would likely overlap in time with the Proposed Action. Cumulative impacts to air quality are anticipated due to the close proximity of these projects. These impacts would result from an increase in PM10 generation in disturbed areas and during excavations, and increased emissions from construction equipment and vehicle exhaust. These effects would be minimized by compliance with Clark County permitting requirements and implementation of mitigation measures.

Estimates of equipment exhaust emissions and fugitive dust from the construction of present and future projects were based on the same general methodology used for the SCOP EIS (CWC, 2006). Air quality impacts presented in Section 4.7 and Appendix G of the SCOP EIS were used

to extrapolate and calculate the potential air quality impacts from present and future projects listed in Table 4.12-1. Tables 4.12-2 and 4.12-3 present an estimate of construction equipment exhaust and fugitive dust, respectively that may be generated during construction of present and future projects in Table 12.1-1. Past projects are not included in this analysis since construction of these projects is complete and no cumulative impacts to air quality would occur from the combined construction of past projects.

Table 4.12-2 Estimated Equipment Exhaust Emissions from Present and Future Projects

Project	Ground Disturbance (acres)	Estimated Construction Duration (years)	Construction Equipment Exhaust Emissions			
			CO Emissions (tons/yr)	NOx + VOC Emissions (tons/yr)	PM ₁₀ Emissions (tons/yr)	SO ₂ Emissions
Present						
Wetlands Park Trails	373	5	34	111	20	2
City of Henderson WRF Expansion	78	3	12	39	7	1
SNWA ECS	52	5	5	16	3	0
Present Total	503	--	51	166	30	2
Future						
SCOP	67	3	10	33	6	0.5
Lake Mead Parkway Expansion	35	3	5	17	3	0
Future Total	102	--	15	50	9	0.5
Sunrise Tap Transmission Line Project						
Proposed Action	259	2	59	193	35	3
Major Source Threshold-Valley Airshed			70	50	70	100
Major Source Threshold-Conformity Determinations			70	100	70	100

Table 4.12-3 Estimated Fugitive Dust Generated from Construction of Present and Future Projects

Project	Ground Disturbance (acres)	Estimated Construction Duration (years)	Uncontrolled Fugitive Dust Emissions ¹ (tons)	Controlled Fugitive Dust Emissions ² (tons)	Uncontrolled Fugitive Dust Emissions ¹ (tons/year)	Controlled Fugitive Dust Emissions ² (tons/year)
Present						
Wetlands Park Trails	373	5	157	78	31	16
City of	78	3	33	16	11	5.5

Henderson WRF Expansion						
SNWA ECS	52	5	22	11	4	2
Present Total	503	--	212	105	46	23.5
Future						
SCOP	67	3	28	14	9	5
Lake Mead Parkway Expansion	35	3	15	7	5	2
Future Total	102	--	43	21	14	7
Sunrise Tap Transmission Line Project						
Proposed Action	259	2	109	54	54	27

Notes:

¹ Fugitive dust emissions reported only for dust with an aerodynamic diameter of less than or equal to ≤ 10 μm . Uncontrolled PM_{10} emissions from ground disturbance were calculated using an emission factor of 0.42 tons PM_{10} per acre (number of acres disturbance \times 0.42) from the PM_{10} State Implementation Plan (SIP) for Clark County (2001).

² Controls include those required in the Clark County SIP for construction activities. Controlled PM_{10} emissions were calculated using an emission factor of 0.21 tons PM_{10} per acre.

Total CO , PM_{10} , and SO_2 emissions from the construction of present and future projects are estimated to be below major source thresholds (Table 4.12-2). Total emissions of $\text{NO}_x + \text{VOCs}$ from the construction of present projects are estimated to exceed thresholds primarily due to the construction of the Wetlands Park Trails. Construction of the Proposed Action in addition to present and future projects is estimated to exceed thresholds for CO , $\text{NO}_x + \text{VOCs}$, and PM_{10} emissions. However, since construction activities of the various projects would not all occur at the same time, total exhaust emissions would likely be lower than estimated during different construction phases. In addition, implementation of the proposed air quality mitigation measures for the Project would reduce estimated construction equipment exhaust emissions.

Total uncontrolled and controlled annual generation of fugitive dust (PM_{10}) from the construction of present and future projects is estimated to be under the 70 tons per year major source threshold for PM_{10} (Table 4.12-3). Construction of the Proposed Action in addition to present and future projects is estimated to exceed the fugitive dust threshold for uncontrolled emissions but still be under the threshold for controlled emissions that would result with the implementation of proposed air quality mitigation measures for the Project.

Topography, Geology and Soils

The Proposed Action would disturb approximately 259 acres of soil surfaces in addition to 1,205 acres of soil disturbance from similar past, present, and foreseeable future projects listed in Table 4.12-1. Total cumulative soil disturbance comprises only 2.2% of the Sunrise Tap Project area of visual influence. The soils in the proximity of the project on the north side of the Las Vegas Wash would have the greatest potential for cumulative impacts from ground disturbance. The SNWA pipeline and access road has disturbed soils and additional disturbance would occur in the same area from the Wetlands Park, SCOP, and SNWA ECS projects. Compliance with erosion, storm

water, and water quality BMPs, and air quality requirements during construction, is required throughout Clark County, and would minimize cumulative impacts.

Cumulatively, the projects do not substantially alter prevailing topography and/or surface relief within the area of visual influence. For most projects, the land would be recontoured and restored to preconstruction conditions following completion of construction. Therefore, the cumulative impact to surface contour features would be minor.

Water Resources

The Proposed Action would disturb approximately 259 acres of ground surface in addition to 1,205 acres of disturbance from similar past, present, and foreseeable future projects listed in Table 4.12-1. Cumulative ground disturbance of present and future projects would increase sediment in storm water discharge to nearby water resources reducing water quality. The Wetlands Park, SCOP, and SNWA ECS projects are in close proximity to the Project north of the Las Vegas Wash and would have the greatest potential for short-term cumulative impacts to the Wash from storm water discharge during construction. The SNWA East Valley Lateral Pipeline and access road has been constructed and has since been stabilized and does not appear to be impacting the Las Vegas Wash from increased runoff or sedimentation. Compliance with NDEP storm water discharge requirements and proper implementation of BMPs would minimize the potential for cumulative impacts to the Las Vegas Wash.

Water and/or chemical palliatives would be used for dust control during construction of similar past, present, and foreseeable future projects. Water would be trucked in and is not expected to affect water needs in the Sunrise Tap Project area of visual influence. Chemical palliatives may be transported to nearby receiving waters through storm water runoff during rain events. Proper application of palliatives and adherence to the Interim Policy on Dust Palliative Use in Clark County, Nevada would reduce the potential for any cumulative adverse impacts to water quality.

Health, Safety, and Noise

The construction of the Proposed Action would not contribute to cumulative EMF effects from past transmission line projects; Harry Allen – Mead, Navajo-McCullough and IPP DC lines.

Cumulative impacts from hazardous materials may result from present and future projects occurring in close proximity including Wetlands Park Trails, City of Henderson WRF expansion, SNWA ECS, SCOP and the Proposed Action. These impacts could result from an increase in heavy equipment and machinery that increases the potential for accidental spills. Potential cumulative impacts would be minimized by implementing chemical handling, storage, and spill prevention plans. In addition, staff would be trained in hazardous materials safety, handling, clean up and removal. With implementation of these measures, the potential for accidental spills would be low and any impacts would be short-term.

Construction of present and future projects (Table 4.12-1) in close proximity to construction of the Proposed Action would result in cumulative short-term impacts on noise. These projects in conjunction with the Proposed Action would generate noise and vibration impacts from the operation of heavy equipment and other construction-related activities. Not all construction activities would overlap reducing impacts. Mitigation measures would limit the potential effects of short-term construction noise on sensitive receptors.

Socioeconomics

Present and future projects, including the Proposed Action, are identified within existing plans and zoning standards so are anticipated in regional infrastructure planning. The increment demand would not have an adverse impact on housing availability.

Public services and public utilities in the area have the capacity to serve present and future projects, and thus cumulative impacts would not be measurable.

Implementation of the Proposed Action and present and future projects would create socioeconomic effects in the form of increased employment, and increased local and state tax revenue associated with economic activity generated by these projects. However, these changes would not have a measurable socioeconomic impact within the cumulative geographic area.

CHAPTER 5 CONSULTATION AND COORDINATION

5.1 AGENCY CONSULTATION

The initial step in the scoping and public involvement process for the Sunrise Tap Transmission Line Project was a series of meetings with stakeholder agencies that were identified in the EVAMP siting and routing study. NPC and POWER Engineers met with a number of federal, state, and local stakeholder agencies during the preparation of the EVAMP study and EA in order to describe the proposed project and solicit input from each agency. As indicated in Table 5.1-1, NPC and POWER met with several agencies on more than one occasion.

In addition, Reclamation consulted with the Nevada State Historic Preservation Office (SHPO), BLM, and NPC on the development of a PA for compliance with the National Historic Preservation Act. Reclamation notified the Advisory Council on Historic Preservation of their intention to enter into a PA. On April 10, 2007, the Advisory Council declined participation in the PA. The PA was reviewed by Nevada SHPO and is being finalized for signature.

Reclamation also notified the following tribes and interested parties of their intention to enter into a PA: Las Vegas Paiute Tribe, Fort Mojave Tribe, Hualapai Tribe, Chemehuevi, Kaibab Paiute, Colorado River Indian Tribe, Havasupai, Paiute Tribe of Utah, Moapa Paiute Tribe, Hopi Tribe, Navajo Nation, Pueblo of Zuni; Las Vegas Indian Center, Pahrump Paiute, ArchaeoNevada, and the Nevada Archaeological Association. No responses were received regarding the agreement.

Table 5.1-1 Agency Meetings for the Sunrise Tap Transmission Line Project

Date	Agency	Agency Personnel in Attendance
March 28, 2005	Bureau of Reclamation–Lower Colorado Region	John Jamrog, Dave Curtis, Jeannie Rutherford
March 28, 2005	Southern Nevada Water Authority	John Evans, Sharon Kennemer, Marie Green, Gordon Holmes
March 29, 2005	Bureau of Land Management–Las Vegas Field Office	Lucas Lucero
March 29, 2005	Lake Las Vegas Resort	Dan Rainey, Jeff Neal (AUS)
March 30, 2005	City of Henderson	Bob Murnane, John Rinaldi, Tracy Foutz, Shelley La Bay
March 30, 2005	Nellis Air Force Base	Gene Rogers
March 30, 2005	City of North Las Vegas	Ned Thomas, Robert Eastman
March 31, 2005	Clark County Comprehensive Planning	Jon Wardlaw, Kevin Smedley, Walter Cairns, Gene Pasinski, Bill Pennington, Shane Ammerman
November 14, 2005	Clark County Comprehensive Planning	Virginia Valentine, Rod Allison,
November 15, 2005	City of Henderson	Phil Speight, Tracy Foutz, John Rinaldi, Mary Kay Peck, Stephanie Garcia-Vauss
November 17, 2005	Bureau of Reclamation–Lower Colorado Region	John Jamrog, Jeannie Rutherford, Rich Murphy
November 17, 2005	Bureau of Land Management–Las Vegas Field Office	Juan Palma, Jeff Steinmetz, Michael Johnson, Suzanne Rowe, Sharon DiPinto, Gail Mars-Smith, Anna Wharton
November 17, 2005	Clark County School District	Guy Corrado
December 16, 2005	Clark County Flood Control District	Kevin Eubanks
December 16, 2005	Clark County Public Works	Denis Cederburg
December 16, 2005	Clark County Comprehensive Planning	Virginia Valentine
December 16, 2005	Southern Nevada Water Authority	John Evans, Scott Krantz
February 4, 2008	U.S. Fish and Wildlife Service	Michael Burroughs
March 10, 2008	Lake Las Vegas Resort	Dan Rainey, Steve Smith
March 13, 2008	Clark County Parks and Recreation	Jane Pike, Bruce Siltoe, Elsie Sellars, Kathleen Blakeslee, Steve Corry
March 14, 2008	Southern Nevada Water Authority	John Evans, Scott Krantz, David Connally, Kurt Lytle
March 17, 2008	Clark County Water Reclamation District	Rick Montague, Sam Scine, Doug Drury, Adam Werner, Chuck Ethridge, Richard Mendes, Punder Pai, Shila Ghia

5.2 FACILITATED MEETINGS

5.2.1 Purpose

The primary component of the Sunrise Tap Transmission Line Project is the new double-circuit 500kV transmission line from the Harry Allen-Mead 500kV transmission line to the Sunrise substation. This new transmission line would cross lands that are managed by different agencies, including the BLM and Reclamation. The new double-circuit 500kV transmission line would be within or in close proximity to several sensitive environmental resources including the Las Vegas Wash, the Clark County Wetlands Park, and the Rainbow Gardens ACEC.

Recognizing the differing goals of the jurisdictional agencies and the sensitive environmental resources in the project area, NPC conducted a series of facilitated meetings with a number of stakeholder agencies and local municipalities. The primary goals of the facilitated meetings were to 1) discuss specific issues and concerns associated with the construction of a 500kV transmission line between the Harry Allen-Mead 500kV transmission line and the Sunrise substation and 2) identify potential alternative routes for the 500kV transmission line that are acceptable to all stakeholders and could be analyzed through the NEPA process.

The meetings were hosted by NPC and were moderated by a third-party facilitator (Strategic Solutions) to encourage participation and frank discussion. Invitations to participate in the facilitated meetings were sent to several stakeholders that were identified through the initial agency consultation meetings. NPC requested that each stakeholder send at least one participant with decision-making authority and who is authorized to provide direction and make commitments on behalf of their agency. Initial invitations to attend the facilitated meetings were sent to the following:

- Bureau of Land Management (Las Vegas Field Manager)
- Bureau of Reclamation (Environmental Compliance Group Manager)
- Clark County (Manager, Assistant Manager, Comprehensive Planning, Redevelopment, Public Works, Parks and Recreation)
- City of Henderson (City Manager, Assistant City Manager, Community Development, Public Works, Parks and Recreation)
- Clark County School District

5.2.2 Summary of Facilitated Meetings

A total of three facilitated meetings were conducted between November 2005 and January 2006. Table 5.2-1 presents a list of individuals that attended one or more of the facilitated meetings. The first facilitated meeting was held on November 29, 2005 at Boulder Station. At this introductory meeting, NPC provided an overview of the project purpose and need and the facilitator identified the goals and objectives for the facilitated meetings. POWER reviewed the project location, including the various jurisdictions and sensitive areas between the Harry Allen-Mead 500kV transmission line and the Sunrise substation. POWER also identified the six preliminary routing alternatives for the 500kV transmission line that had been developed in the EVAMP siting and routing study. Maps identifying these routing alternatives were given to all stakeholders. The facilitator asked all meeting participants to review the maps and would be prepared to provide input/suggestions on the routing alternatives at the second meeting.

Table 5.2-1 Facilitated Meeting Attendees

Agency	Personnel
Bureau of Reclamation–Lower Colorado Region	Dave Curtis Rich Murphy John Jamrog Laureen Perry
Bureau of Land Management–Las Vegas Field Office	Jeff Steinmetz Michael Johnson Susanne Rowe Scott Sanderford Gayle Marrs-Smith Lucas Lucero Shonna Dooman Mark Slaughter Sharon DiPinto Carrie Ronning
City of Henderson	Tracy Foutz
Clark County Comprehensive Planning	Walter Cairns
City of Henderson	Tracy Foutz
Clark County School District	Guy Corrado
Clark County Flood Control District	Kevin Eubanks
Clark County Water Reclamation District	Richard Montague
Clark County Public Works	Ken Lambert
Clark County Parks and Recreation	Kathleen Blakely Bruce Sillitoe
Nevada Power Company	Art Davoren Eileen Wynkoop Joanna Alvarado Rich Carlson Dave Rigdon Sharon McShea Rob Woodard JoAnn Meacham Edgar Patino Jim Saavedra Jim Reilly Stan Rolf
POWER Engineers	Lynn Askew Terry Enk Mark Schaffer Laurie Kaufman
Strategic Solutions	Ron Cameron (facilitator)

The second facilitated meeting was held on December 15, 2005 at Boulder Station. An additional stakeholder, Clark County Water Reclamation District, attended this meeting. POWER reviewed the six preliminary routing alternatives that were identified in the first meeting and requested stakeholder input on these alternatives. The factors that were considered in the development of the preliminary alternatives were reviewed. The preliminary route alternatives were then discussed by the stakeholders. At the conclusion of the second facilitated meeting, two additional route alternatives were developed. The primary issues and concerns discussed at this meeting included:

- Sensitive biological resources in the Rainbow Gardens ACEC
- Sensitivity of the Sunrise Instant Study Area (ISA), Clark County Wetlands Park, and Las Vegas Wash
- Las Vegas Wash and Clark County Wetlands Park viewsheds
- Clark County School District property at the intersection of Hollywood Boulevard and Vegas Valley Drive
- Planned recreational trails in Clark County Wetlands Park
- Construction of new roads and increased off-road vehicle use in the Rainbow Gardens ACEC
- Proximity to C1 channel, Henderson landfill, and SNWA water pipelines
- Las Vegas Wash archaeological district
- Residential areas along the 500kV and 230kV transmission lines
- Communication towers

The third facilitated meeting was held on January 19, 2006 at Sam's Town. There was a prolonged stakeholder discussion regarding the potential issues (pros and cons) associated with the various route alternatives. The stakeholders cooperatively agreed that four of the eight route alternatives should be eliminated from further consideration due to a variety of issues. The remaining four alternative routes would be carried forward and evaluated in the NEPA process.

The facilitated meeting process for the Sunrise Tap Transmission Line Project was successful on several levels. First, they brought together a group of diverse stakeholders and encouraged frank discussion among the participants. Second, the process helped NPC to identify the major issues and stakeholder concerns associated with the construction of the proposed 500kV transmission line. Third, the process culminated with the stakeholder agreement on a set of four potential alternative routes for the 500kV transmission line. The identification of issues, delineation of alternative routes, and the involvement of several stakeholder groups were important part of the NEPA scoping process.

5.3 SOUTHERN NEVADA REGIONAL PLANNING COALITION (SNRPC) BRIEFING

The SNRPC membership includes Clark County, the cities of Boulder City, Henderson, Las Vegas, and North Las Vegas, and the Clark County School District. The principal purpose for the SNRPC is to promote regional collaboration and planning. The SNRPC has developed a process for cooperative review of Projects of Regional Significance, which include large transmission lines. In accordance with SNRPC regulations, NPC briefed the SNRPC technical committee on the proposed Sunrise Tap Transmission Line Project on January 23, 2006. Upon completion of the NEPA process, NPC will submit a conformity analysis and review for SNRPC consideration and evaluation.

5.4 PUBLIC SCOPING MEETING SUMMARY

5.4.1 Meeting Information

The public scoping meeting for the Sunrise Tap Transmission Line Project was held from 5 PM to 7 PM on Thursday, November 2, 2006 at the City of Henderson Convention Center. Invitations to attend the public scoping meeting were mailed to interested agencies that were identified by Reclamation and the BLM as well as to all property owners within 500 feet of the proposed project. A copy of the invitation letter is provided in Appendix B. Approximately 2,500 invitation letters were sent out on October 19, 2006 (two weeks before the meeting). This letter indicated that written comments would be accepted at the meeting and by mail until December 1, 2006. Additionally, an advertisement inviting the public to attend the scoping meeting was run in the Public Service Announcement section of the Las Vegas Journal Review on October 19, 2006.

The meeting room was arranged to include a sign in table and series of information stations. Upon entering the meeting room, attendees were asked to sign in and take a comment form before proceeding to the stations. The information stations included 1) a greeting/sign in table, 2) project description, 3) alternatives being considered and alternatives eliminated from consideration, 4) engineering and right-of-way, 5) environmental issues, and 6) NEPA process and timeline. Each station included project maps, exhibits, and photographs and was manned by one or more representatives from Reclamation, BLM, NPC, and POWER Engineers. These representatives included engineers and environmental specialists and are identified in Table 5.4-1.

5.4.2 Public Participation

A total of 13 individuals attended the public scoping meeting. Attendees included representatives from several agencies, including Clark County School District, Clark County Parks and Recreation, and Clark County Water Reclamation District, and the general public.

5.4.3 Summary of Comments

Comment Forms Submitted at the Scoping Meeting

A total of 2 comment forms were received at the public scoping meeting. These comments are summarized in Table 5.4-2 and included the following general topics:

- effects of the project on the residential land values
- dust control
- crossing the flood control channel
- preference for Alternative 1 (500kV transmission line route).

Comment Letters Submitted via Mail or Internet

A total of 10 comment letters were received via mail or email. These included letters from 3 individuals and 6 agencies. These comments are summarized in Table 5.4-2, and included the following general topics:

- existing easement width for the Las Vegas #3 transmission line through the Clark County Wetlands Park
- electromagnetic radiation
- effects on Clark County Wetlands Park
- concurrence with state plans, goals, and objectives
- wildlife issues, including raptors, peregrine falcons, burrowing owls, and desert tortoise

- maximizing the use of existing rights-of-way
- tap point locations
- project coordination with the Southern Nevada Water Authority
- “telephone line road” through the Wetlands Park

Table 5.4-1 Agency Representatives at the Public Scoping Meeting

Individual	Agency
Greeting Table	
Dave Curtis	Bureau of Reclamation
Scott Sanderford	Bureau of Land Management
Lisa Gerhardt	Nevada Power Company
Project Description	
Art Davoren	Nevada Power Company
Terry Enk	POWER Engineers
Mark Schaffer	POWER Engineers
Alternatives	
Dave Rigdon	Nevada Power Company
Lynn Askew	POWER Engineers
Engineering & ROW	
Steve Payne	Nevada Power Company
Tom Petrosky	Nevada Power Company
Environmental Issues	
Laureen Perry	Bureau of Reclamation
Mark Slaughter	Bureau of Land Management
Stan Rolf	Nevada Power Company
NEPA Process	
Rich Murphy	Bureau of Reclamation
Michael Johnson	Bureau of Land Management
Comment Table	
Laurie Kaufman	POWER Engineers

Table 5.4-2 Summary of Public Scoping Comments

Commenter	Comment Vehicle	Comment/Issues
Soon B. Holl	Comment submitted via email	Ms. Holl asked what impact the project will have on the value of her properties as potential custom home sites.
Diane Fennell	Comment Form	1) The project should maximize distance of project from residences. 2) The project should include dust control.
Rick Montague	Comment Form	1) Expressed a preference for Alternative Route 1. 2) The project should avoid crossing the flood channel and stay east of Hollywood Boulevard.
Michael Schneider (First set of comments)	Comments submitted via email	1) Asked about the current easement width for the Las Vegas #3 69kV Transmission Line through the Clark County Wetlands Park. 2) Asked whether the easement width needs to be expanded through the Wetlands Park area to accommodate the upgrade of the Las Vegas #3 Transmission Line.
Tolbert Cockburn	Comments submitted via mail	1) Expressed concern over electromagnetic waves. 2) Asked if transmission line [230kV] could be constructed in a less populated area.
Patricia Marchese – Clark County Parks and Recreation	Comments submitted via fax	Ms. Marchese stated that his agency is interested in making sure the proposed project does not directly or indirectly affect the quality of the Clark County Wetlands Park.
Gosia Sylwestrzak – Nevada State Clearinghouse	Comments submitted via mail	Mr. Sylwestrzak stated that the project is not in conflict with state plans, goals, or objectives.
Roddy Shepard – Nevada Department of Wildlife	Comments submitted via mail	1) The Rainbow Gardens area contains habitat for several raptors, including a peregrine falcon nest site. 2) Towers should be configured to minimize potential for raptor mortality. 3) The project area contains habitat for the banded gila monster. The project should implement Department protocols for the banded gila monster. 4) The Department would prefer an alternative I which the 500kV transmission line runs parallel to the Las Vegas #3 transmission line. 5) Burrowing owl surveys should be conducted in the vicinity of the Equestrian Substation to determine the presence of breeding individuals (mid-March through June). The project should ensure that breeding owls are not disturbed during construction.

Commenter	Comment Vehicle	Comment/Issues
		6) The project would likely have similar impacts to the desert tortoise as the Harry Allen-Mead transmission line. Guidance for the species will be provided by the U.S. Fish and Wildlife Service.
Skip Canfield – Nevada Division of State Lands	Comments submitted via mail	The Nevada Division of State Lands encourages the use of existing rights-of-way wherever possible to limit the negative visual impacts on public and private lands.
Daniel Rainey – Lake Las Vegas Resort	Comments submitted via mail	Mr. Rainey indicated that Lake Las Vegas would prefer the northernmost location for the tap point on the Harry Allen-Mead transmission line.
Leanne Miller – Southern Nevada Water Authority	Comments submitted via mail	<ol style="list-style-type: none"> 1) NPC will be required to submit project plans for approval by the Authority. 2) A stray current analysis may be required for transmission lines that cross or run parallel to the Authority’s water pipelines. 3) NPC should coordinate project planning with the Authority for the proposed new segments of transmission line. 4) The Authority is planning a solar/photovoltaic facility near the Equestrian substation. NPC should coordinate with the Authority regarding this issue.
Robert Williams – U.S. Fish and Wildlife Service	Comments submitted via mail	<ol style="list-style-type: none"> 1) Agency supports alternatives that cross Reclamation lands rather than crossing through BLM lands due to concerns over visual resources, bear poppy, and new ground disturbance. 2) Agency expressed concern regarding potential impacts of the project on migratory birds.
Michael Schneider (Second set of comments)	Comments submitted via email	Mr. Schneider had several questions regarding the existing “telephone line road” that crosses through the Wetlands Park.

CHAPTER 6 LIST OF PREPARERS

This chapter presents a list of persons who comprised the interdisciplinary project team and participated in, or were consulted during preparation of this EA.

Nevada Power Company

Art Davoren	Project management
Michael Della Vecchia	Transmission line design engineer
Tom Dombrowski	Right-of-way services
Tom Petrosky	Right-of-way services
Stanton Rolf	Environmental specialist
Eileen Wynkoop	Environmental management

POWER Engineers, Inc.

Aaron Ames	GIS analysis and mapping
Steve Anderson	Visual simulations
Lynn Askew	Project management and soils
Dave Dean	Biological resources evaluation
Terry Enk	Project coordination, biological, topography, geology, soils, and socioeconomic resources evaluation
Linda Erdmann	Project coordination, air quality and water resources evaluation
Gina Fegler	Visual resources evaluation
Darrin Gilbert	Visual resources evaluation
Tim Hazekamp	GIS analysis and mapping
Kira Kefer	Document management and production
Mark Schaffer	Land use, health, safety, and noise resources evaluation

SWCA Environmental Consultants

Heather Stettler	Cultural resources evaluation
Jess DeBusk	Paleontological resources evaluation
David Brown	Biological field investigations
Paul Murphey	Paleontology technical review
Lauren Fuerst	GIS mapping
Catherine Smith	GIS mapping

Bureau of Reclamation

Dave Curtis	Lands and right-of-way
Jerry Hickman	Wildlife technical review
Marc Maynard	Project management and NEPA technical review
Richard Murphy	Project management and NEPA technical review
Laureen Perry	Cultural technical review

Bureau of Land Management

Michael Johnson	Visual technical review
Gayle Marrs-Smith	Botanical technical review
Mark Slaughter	Wildlife technical review
Beth Domowicz	Project management and NEPA technical review

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APPENDIX A

Visual Contrast Rating Worksheets

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Date 10/4/2007
District _____
Resource Area LAS VEGAS
Activity (program) _____

VISUAL CONTRAST RATING WORKSHEET

SECTION A. PROJECT INFORMATION

1. Project Name <u>SUNRISE TAP (500 KV)</u>	4. Location	5. Location Sketch
2. Key Observation Point <u>#1</u>	Township <u>21 S</u>	
3. VRM Class <u>NA / CLASS III</u>	Range <u>62 E</u>	
	Section <u>15</u>	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SOME UNDULATION HILLS ON UNDEVELOPED LAND, FLAT - NO WATER	SPARSE, RANDOM CLUMPY	LINEAR
LINE	HORIZONTAL RIDGES, ROADWAYS/SIDEWALK	NONE	VERTICAL
COLOR	TANS & BROWNS, DARKER ASPHALT AREAS	SOME GREEN, TYP. TANS / BROWNS	GREYS & BROWNS
TEXTURE		FINE, MEDIUM	Smooth

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	INDISTINCT, FLAT	NA	GEOMETRIC, LINEAR
LINE	GEOMETRIC, SQUARE		DIAGONAL, ANGULAR & VERTICAL
COLOR	LIGHT BROWN/TAN		DULL SILVER/GREY
TEXTURE	SMOOTH		SMOOTH

SECTION D. CONTRAST RATING

DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <div>Yes</div> No (Explain on reverse side)	
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None		
ELEMENTS	Form			X				X		X				3. Additional mitigating measures recommended Yes <div>No</div> (Explain on reserve side) Evaluator's Names _____ Date _____ <div>DARRIN GILBERT 10/4/07</div>	
	Line			X				X		X					
	Color		X					X			X				
	Texture			X				X				X			

Section D. (continued)

Comments from item 2.

- SEE CHAPTER 4 DESCRIPTION
- VRM CLASS III LANDS IN BACKGROUND
NOT CROSSED BY PROJECT IN THIS VIEW

Additional Mitigating Measures (See item 3)

NONE. PROJECT WIDE MITIGATION WILL BE APPLIED.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	10/5/2007
District	
Resource Area	LAS VEGAS
Activity (program)	ALTERNATIVES 1, 3 & 4

SECTION A. PROJECT INFORMATION

1. Project Name SUNRISE TAP (500KV)	4. Location Township 21 S Range 62 E Section 24	5. Location Sketch S. Hollywood SUNRISE TRAILHEAD PARKING SHELTER
2. Key Observation Point # 2		
3. VRM Class NA / III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	MOUNTAINOUS, JAGGED SURROUNDED BY FLAT OPEN LANDSCAPE	ASCENT, REGULAR SOME FORMAL PLANTINGS	LINEAR, SHORT VERT. LONG HORIZONTAL
LINE	IRREGULAR	WEAK	DISTINCTIVE
COLOR	BROWN, GREEN, TAN	GREEN → BROWN	DARK BROWN
TEXTURE	MEDIUM-COURSE	MEDIUM-COURSE	SMOOTH-MODERATE

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE KOP#1	" →	
LINE	"		
COLOR	↓		
TEXTURE			

SECTION D. CONTRAST RATING SHORT TERM LONG TERM

DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <div>Yes</div> No (Explain on reverse side)			
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)						3. Additional mitigating measures recommended Yes <div>No</div> (Explain on reserve side)	
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None				
ELEMENTS	Form			X				X		X				Evaluator's Names DARRIN GILBERT Date 10/5/2007			
	Line			X				X		X							
	Color		X					X			X						
	Texture			X				X			X						

Section D. (continued)

Comments from item 2.

- SEE CHAPTER 4 DESCRIPTION
- VRM CLASS III LANDS IN BACKGROUND
NOT CROSSED BY PROJECT IN THIS VIEW

Additional Mitigating Measures (See item 3)

NONE. PROJECT WIDE MITIGATION IMPLEMENTED.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	10/5/2007
District	
Resource Area	LAS VEGAS
Activity (program)	ALTERNATIVE 2

SECTION A. PROJECT INFORMATION

1. Project Name SUNRISE TAP (500KV)	4. Location Township _____ Range _____ Section _____	5. Location Sketch SEE SHEET 3
2. Key Observation Point # 2		
3. VRM Class N/A - CLASS III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE SHEET 3		
LINE			
COLOR			
TEXTURE			

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE SHEET 3		
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING SHORT TERM LONG TERM

DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? Yes <input checked="" type="radio"/> No (Explain on reverse side)	
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					3. Additional mitigating measures recommended Yes <input type="radio"/> No <input checked="" type="radio"/> (Explain on reserve side)
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None		
ELEMENTS	Form		X					X		X					Evaluator's Names DARRIN GILBERT Date 10/5/2007
	Line			X				X		X					
	Color		X					X			X				
	Texture		X					X			X				

KOP #2

Section D. (continued)

Comments from item 2.

- SEE CHAPTER 4 DESCRIPTION
- VRM CLASS III LANDS IN BACKGROUND
NOT CROSSED BY PROJECT IN THIS VIEW

Additional Mitigating Measures (See item 3)

NONE. PROJECT-WIDE MITIGATION WILL BE APPLIED.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	10/5/2007
District	
Resource Area	LAS VEGAS
Activity (program)	ALTERNATIVE 1

SECTION A. PROJECT INFORMATION

1. Project Name SUNRISE TAP (500KV)	4. Location	5. Location Sketch
2. Key Observation Point #3	Township 21 S	
3. VRM Class NA / CLASS III	Range 63 E	
	Section 30	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	MOUNTAINOUS, JAGGED FLAT IN FOREGROUND	ABSENT, CLUMPY IN BACKGROUND	INDISTINCT
LINE	IRREGULAR	WEAK	N/A
COLOR	BROWN, TAN, RUST	GREY / GREEN	N/A
TEXTURE	MEDIUM → COARSE	MEDIUM → COARSE	N/A

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE KOP#1	SHEET 1	
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING SHORT TERM LONG TERM

DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="radio"/> Yes <input type="radio"/> No (Explain on reverse side) 3. Additional mitigating measures recommended Yes <input checked="" type="radio"/> No (Explain on reserve side)	
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None		
ELEMENTS	Form			X				X		X					Evaluator's Names DARRIN GILBERT Date 10/5/2007
	Line			X				X		X					
	Color		X					X			X				
	Texture			X				X			X				

KOP #3

Section D. (continued)

Comments from item 2.

- SEE CHAPTER 4 DESCRIPTION
- URM CLASS III LANDS IN FOREGROUND, KOP ON BOR LANDS,

Additional Mitigating Measures (See item 3)

NONE. PROJECT-WIDE MITIGATION WILL BE APPLIED.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	10/5/2007
District	
Resource Area	LAS VEGAS
Activity (program)	ALTERNATIVES 2 & 3

SECTION A. PROJECT INFORMATION

1. Project Name SUNRISE TAP (500KV)	4. Location Township 21 S Range 63 E Section 30	5. Location Sketch SEE SHEET 7
2. Key Observation Point #3		
3. VRM Class N/A - CLASS III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE SH. 7		
LINE			
COLOR			
TEXTURE			

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE KOP #1		
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING

		FEATURES													
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None		
ELEMENTS	Form		X					X		X				2. Does project design meet visual resource management objectives? Yes No (Explain on reverse side) N/A 3. Additional mitigating measures recommended Yes (No) Explain on reserve side)	
	Line			X				X		X					
	Color			X				X			X				
	Texture			X				X			X				
														Evaluator's Names	Date
														PARAN GILBERT	10/5/2007

KOP #3

Section D. (continued)

Comments from item 2.

- SEE CHAPTER 4 DESCRIPTION

- VRM CLASS III IN FOREGROUND, PROJECT DOES NOT CROSS
BLM LANDS IN THIS VIEW

Additional Mitigating Measures (See item 3)

SEE SHEET 8

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	10/5/2007
District	
Resource Area	LAS VEGAS
Activity (program)	ALTERNATIVE 4

SECTION A. PROJECT INFORMATION

1. Project Name SUNRISE TAP (500KV)	4. Location Township 21S Range 63E Section 30	5. Location Sketch SEE SHEET 7
2. Key Observation Point #3		
3. VRM Class N/A - CLASS III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE SHEET 7		
LINE			
COLOR			
TEXTURE			

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE KOP #1		
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING

		FEATURES												SHORT TERM		LONG TERM	
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)							
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None				
ELEMENTS	Form			X				X		X				2. Does project design meet visual resource management objectives? Yes No (Explain on reverse side) N/A		3. Additional mitigating measures recommended Yes No (Explain on reserve side)	
	Line			X				X		X							
	Color			X				X			X						
	Texture			X				X			X						
														Evaluator's Names		Date	
														DARRIN GILBERT		10/5/2007	

KOP #3

Section D. (continued)

Comments from item 2.

- SEE CHAPTER 4 DESCRIPTION
- VRM CLASS III IN FOREGROUND. PROJECT DOES NOT CROSS BLM LANDS IN THIS VIEW.

Additional Mitigating Measures (See item 3)

SEE SHEET 8

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	10/5/2007
District	
Resource Area	LAS VEGAS
Activity (program)	ALTERNATIVE 1

SECTION A. PROJECT INFORMATION

1. Project Name SUNRISE TAP (500KV)	4. Location	5. Location Sketch
2. Key Observation Point #4	Township 21 S	
3. VRM Class N/A - CLASS III	Range 63 E	
	Section 32	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	FLAT, OPEN DISTANT MOUNTAINS	REGULAR, RANDOM	RECTANGULAR
LINE	HORIZONTAL PLANE	WEAK	HORIZONTAL
COLOR	TANS & BROWNS	GREY - GREEN	BROWN & GREY
TEXTURE	MEDIUM - FINE	FINE	MEDIUM - FINE

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE KOP #1		
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING SHORT TERM LONG TERM

DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? Yes No (Explain on reverse side) 3. Additional mitigating measures recommended Yes No (Explain on reserve side)	
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None		
ELEMENTS	Form		X					X		X				Evaluator's Names DARRIN GILBERT Date 10/4/	
	Line		X					X		X					
	Color			X				X			X				
	Texture			X				X			X				

KOP #4

Section D. (continued)

Comments from item 2.

- SEE CHAPTER 4 DESCRIPTION
- VRM CLASS III IN BACKGROUND. PROJECT WILL NOT DOMINATE THE VIEWSHED DUE TO DISTANCE.

Additional Mitigating Measures (See item 3)

NONE - PROJECT-WIDE MITIGATION WILL BE APPLIED.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	10/5/2007
District	
Resource Area	LAS VEGAS
Activity (program)	ALTERNATIVES 2, 3, 4

SECTION A. PROJECT INFORMATION

1. Project Name SUNRISE TAP (500 KV)	4. Location	5. Location Sketch
2. Key Observation Point #4	Township 21 S	SEE SHEET 13
3. VRM Class	Range 63 E	
NA	Section 32	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE SHEET 13		
LINE			
COLOR			
TEXTURE			

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE KOP #1		
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING

		FEATURES												2. Does project design meet visual resource management objectives?	
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				Yes	No (Explain on reverse side)
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None		
ELEMENTS	Form		X					X		X				3. Additional mitigating measures recommended Yes <input type="radio"/> No <input checked="" type="radio"/> (Explain on reserve side)	
	Line		X					X		X					
	Color			X				X			X				
	Texture			X				X			X				
														Evaluator's Names	Date
														DARRIN GILBERT	10/4/07

KOP #4

Section D. (continued)

Comments from item 2.

- SEE SHEET 14

Additional Mitigating Measures (See item 3)

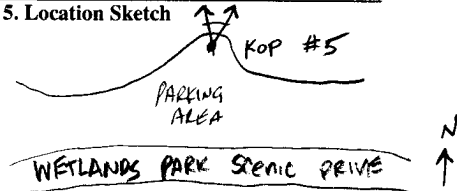
- SEE SHEET 14

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	10/5/2007
District	
Resource Area	LAS VEGAS
Activity (program)	ALTERNATIVE 2, 3

SECTION A. PROJECT INFORMATION

1. Project Name SUNRISE TAP (500KV)	4. Location Township 21S Range 63E Section 28	5. Location Sketch 
2. Key Observation Point #5		
3. VRM Class N/A-CLASS III		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	IRREGULAR, JUGGED UNOULATIONS, FLOWING WATER	CLUMPY, WAVY	NA
LINE	WEAK HORIZONTAL PLANE	INDISTINCT	
COLOR	VARIED, DARK BROWNS, TANS, RUST	DOMINATING GREENS	
TEXTURE	MEDIUM-COURSE	FINE-MEDIUM	

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE KOP #1		
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING SHORT TERM LONG TERM

DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="radio"/> Yes <input type="radio"/> No (Explain on reverse side) 3. Additional mitigating measures recommended Yes <input type="radio"/> No <input checked="" type="radio"/> (Explain on reserve side)	
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None		
ELEMENTS	Form		X					X		X					Evaluator's Names DARRIN GILBERT Date 10/5/2007
	Line		X					X		X					
	Color			X				X			X				
	Texture		X					X			X				

KOP # 5

Section D. (continued)

Comments from item 2.

- SEE CHAPTER 4 DESCRIPTION

- VRM CLASS III LANDS IN FOREGROUND, PROJECT
DOES NOT DOMINATE VIEWS

Additional Mitigating Measures (See item 3)

NONE. PROJECT-WIDE MITIGATION WILL BE APPLIED.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	10/5/2007
District	
Resource Area	LAS VEGAS
Activity (program)	ALTERNATIVE 4

SECTION A. PROJECT INFORMATION

1. Project Name SUNRISE TAP (500KV)	4. Location	5. Location Sketch
2. Key Observation Point #5	Township 21S	SEE SHEET 17
3. VRM Class	Range 63E	
NA - CLASS III	Section 28	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE SHEET 17		
LINE			
COLOR			
TEXTURE			

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE KOP #1		
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING

		FEATURES												SHORT TERM		LONG TERM		2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side) 3. Additional mitigating measures recommended Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> (Explain on reserve side)
DEGREE OF CONTRAST	ELEMENTS	LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				Evaluator's Names	Date			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None					
	Form		X					X		X								
	Line		X					X		X								
	Color			X				X			X							
	Texture			X				X			X							

DARRIN GILBERT 10/5/2007

KOP #5

Section D. (continued)

Comments from item 2.

-SEE SHEET 18

Additional Mitigating Measures (See item 3)

-SEE SHEET 18

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Date	10/5/2007
District	
Resource Area	LAS VEGAS
Activity (program)	230 KV SUNRISE-EQUESTRIAN

VISUAL CONTRAST RATING WORKSHEET

SECTION A. PROJECT INFORMATION

1. Project Name SUNRISE TAP (230 KV)	4. Location Township 22 S Range 63 E Section 4	5. Location Sketch
2. Key Observation Point #6		
3. VRM Class N/A		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SLOPING, UNDULATING	VARIED, NATURAL CLUMPING, LANDSCAPE	BOXY, BLOCKY, RECTANGULAR
LINE	INDISTINCTIVE	INDISTINCTIVE	HORIZONTAL, VERTICAL
COLOR	VARIABLE, BROWN, TAN GRAY	GREEN, GREY, BROWN	EARTH TONE
TEXTURE	MEDIUM - COARSE	COURSE → FINE	COURSE

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	SEE KOP #1		
LINE			
COLOR			
TEXTURE			

SECTION D. CONTRAST RATING

DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? Yes No (Explain on reverse side) N/A			
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)							
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None				
ELEMENTS	Form			X				X			X				3. Additional mitigating measures recommended Yes No (Explain on reserve side) <input checked="" type="radio"/> No (Explain on reserve side)	Evaluator's Names DARRIN GILBERT	Date 10/5/2007
	Line			X				X			X						
	Color			X				X				X					
	Texture			X				X				X					

KOP #6

Section D. (continued)

Comments from item 2.

-SEE CHAPTER 4 FOR DESCRIPTION

Additional Mitigating Measures (See item 3)

NONE. PROJECT-WIDE MITIGATION WILL BE APPLIED.

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date	12-12-07
District	
Resource Area	Las Vegas
Activity (program)	Sunrise - Clark

SECTION A. PROJECT INFORMATION

1. Project Name Sunrise Tap (230KV)	4. Location	5. Location Sketch
2. Key Observation Point #8	Township 21 S	
3. VRM Class N/A	Range 62 E	
	Section 15	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Undulating across even base elevation, no water - golf course	sparse, random ornamental planting; even, uniform grass cover on golf course	boxy, rectangular
LINE	horizontal-undulating	none	horizontal - fences, existing transmission lines
COLOR	tan, rose, orange	green, yellow, tan	browns, tans
TEXTURE	fine	fine/medium	smooth

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	indistinct, flat	n/a	geometric, linear
LINE	geometric, square		vertical, angular
COLOR	light brown, tan		dull silver/gray
TEXTURE	smooth		smooth

SECTION D. CONTRAST RATING SHORT TERM LONG TERM

DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (Explain on reverse side) 3. Additional mitigating measures recommended <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No (Explain on reserve side)	
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)					
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None		
ELEMENTS	Form			X	X			X			X			Evaluator's Names Date Gina Fegler 12-11-07	
	Line			X	X			X			X				
	Color			X				X				X			
	Texture			X	X			X				X			

Section D. (continued)

Comments from item 2.

See chapter 4 description.

Additional Mitigating Measures (See item 3)

None. Project-wide mitigation will be applied.

APPENDIX B

Scoping Letter

October 19, 2006

Dear Interested Party:

Nevada Power Company (NPC) is proposing the construction of new electrical transmission facilities in the southeast Las Vegas Valley. As a result of rapid growth and the associated increase in electrical demand, the company has determined that a new double-circuit, 500kV transmission line and other related transmission and substation improvements are needed to maintain an adequate and reliable supply of electricity to existing and future customers. The proposed improvements are collectively referred to as the Sunrise Tap Transmission Line Project, and they will allow NPC to adequately support commercial and residential customers in the southeastern Las Vegas Valley (see attached map).

Electrical system studies have identified the existing Sunrise Generating Station as the most efficient location to inject additional electricity into southeast Las Vegas. This is due to several factors, including proximity to 1) the existing 500kV transmission system, 2) the location of existing and future demand, and 3) the existing electrical distribution infrastructure that supplies electricity to southeast Las Vegas. The proposed Sunrise Tap Transmission Line Project consists of the following components:

- A new double-circuit, 500kV transmission line (lattice and single pole structures) from the Harry Allen-Mead 500kV transmission line to the NPC-owned Sunrise Generating Plant and Substation.
- A new quad-circuit, 230kV transmission line (single steel poles) from the Sunrise Generating Plant and Substation to the existing NPC-owned Equestrian Substation. The northern portion of this line would replace the existing Las Vegas #3 transmission line. The southern portion would be a new line constructed in the designated utility corridor.
- A new quad-circuit, 230kV transmission line (single steel poles) from the Sunrise Generating Plant and Substation to the existing Clark Generating Plant and Substation. This line would replace the existing Las Vegas #1 transmission line.
- New quad-circuit, 138kV transmission lines (single steel poles) from the Sunrise Generating Plant and Substation to the existing Winterwood Substation.
- Improvements to NPC's existing Clark, Sunrise, and Winterwood substations. All improvements would occur on NPC-owned lands.

Since portions of the proposed project are located on land managed by the Bureau of Reclamation (Reclamation) and Bureau of Land Management (BLM), the project must comply with the National Environmental Policy Act. The National Environmental Policy Act requires Reclamation and the BLM to analyze the potential environmental impacts associated with the Sunrise Tap Transmission Line Project. These agencies have decided that NPC will prepare an Environmental Assessment to examine the impact of the proposed project.

The National Environmental Policy Act also requires federal agencies to consider input from the public. The agencies will be holding a public scoping meeting for the Sunrise Tap Transmission Line Project in order to provide information and to solicit input from the public. Representatives from Reclamation, BLM and NPC, including engineers and environmental specialists, will be available to discuss the project at the meeting. Reclamation will be the lead agency to conduct the review under the National Environmental Policy Act.

You are invited to attend a public scoping meeting to discuss the Sunrise Tap Transmission Line Project. This public scoping meeting will be held at the City of Henderson Convention Center (200 Water Street) on Thursday, November 2, 2006, from 5-7 p.m. There will be an opportunity for individuals to provide written comments at this meeting. Written comments will also be accepted until 5 p.m. on December 1, 2006. Please send comments to Richard Murphy, Bureau of Reclamation-Lower Colorado Region, P.O. Box 61470, Boulder City, NV, 89006 or email to **rcmurphy@lc.usbr.gov**.